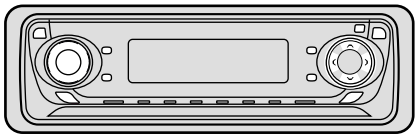
Pioneer sound.vision.soul

# Service Manual



ORDER NO.
**CRT2784**

**MULTI-CD/DAB CONTROL HIGH POWER CD/MP3 PLAYER WITH RDS TUNER**

# DEH-P7400MP XN/EW

COMPACT disc DIGITAL AUDIO

● This service manual should be used together with the following manual(s):

| Model No. | Order No. | Mech. Module | Remarks |
|---|---|---|---|
| CX-3007 | CRT2820 | S9MP3 | CD Mech. Module:Circuit Description, Mech.Description, Disassembly |

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For details, refer to "Important symbols for good services".


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**K-ZZD. DEC. 2001 Printed in Japan**

**[ Important symbols for good services ]**
In this manual, the symbols shown-below indicate that adjustments, settings or cleaning should be made securely.
When you find the procedures bearing any of the symbols, be sure to fulfill them:

1. Product safety

You should conform to the regulations governing the product (safety, radio and noise, and other regulations), and should keep the safety during servicing by following the safety instructions described in this manual.

2. Adjustments

To keep the original performances of the product, optimum adjustments or specification confirmation is indispensable. In accordance with the procedures or instructions described in this manual, adjustments should be performed.

3. Cleaning

For optical pickups, tape-deck heads, lenses and mirrors used in projection monitors, and other parts requiring cleaning, proper cleaning should be performed to restore their performances.

4. Shipping mode and shipping screws

To protect the product from damages or failures that may be caused during transit, the shipping mode should be set or the shipping screws should be installed before shipping out in accordance with this manual, if necessary.

5. Lubricants, glues, and replacement parts

Appropriately applying grease or glue can maintain the product performances. But improper lubrication or applying glue may lead to failures or troubles in the product. By following the instructions in this manual, be sure to apply the prescribed grease or glue to proper portions by the appropriate amount.For replacement parts or tools, the prescribed ones should be used.

## ● CD Player Service Precautions

1. For pickup unit(CXX1550) handling, please refer to"Disassembly"(see page 51)
   During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a jumper-solder).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.
3. Please checking the grating after changing the service pickup unit(see page 45).

# 1. SAFETY INFORMATION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer.
Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.
Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

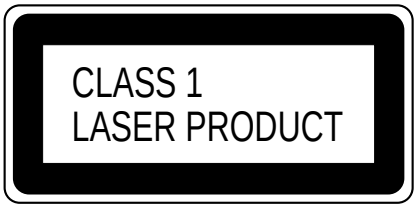
**1. Safety Precautions for those who Service this Unit.**

- **When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.**

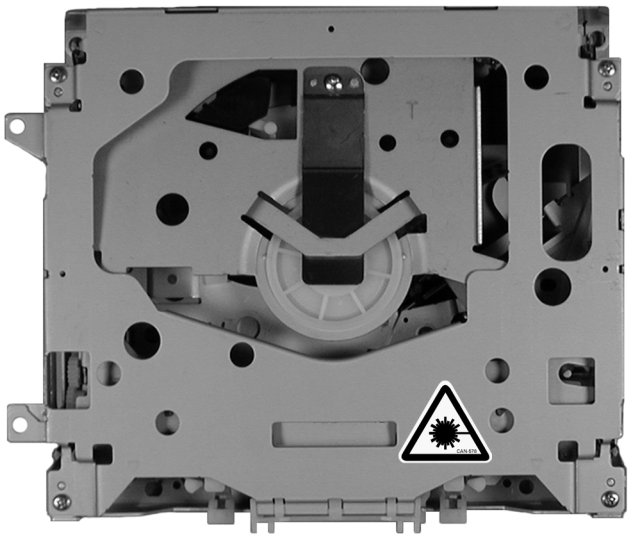
**Caution:**

**1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.**
**2. During repair or tests, do not view laser beam for 10 seconds or longer.**

**2. A "CLASS 1 LASER PRODUCT" label is affixed to the bottom of the player.**




**3. The triangular label is attached to the mechanism unit frame.**

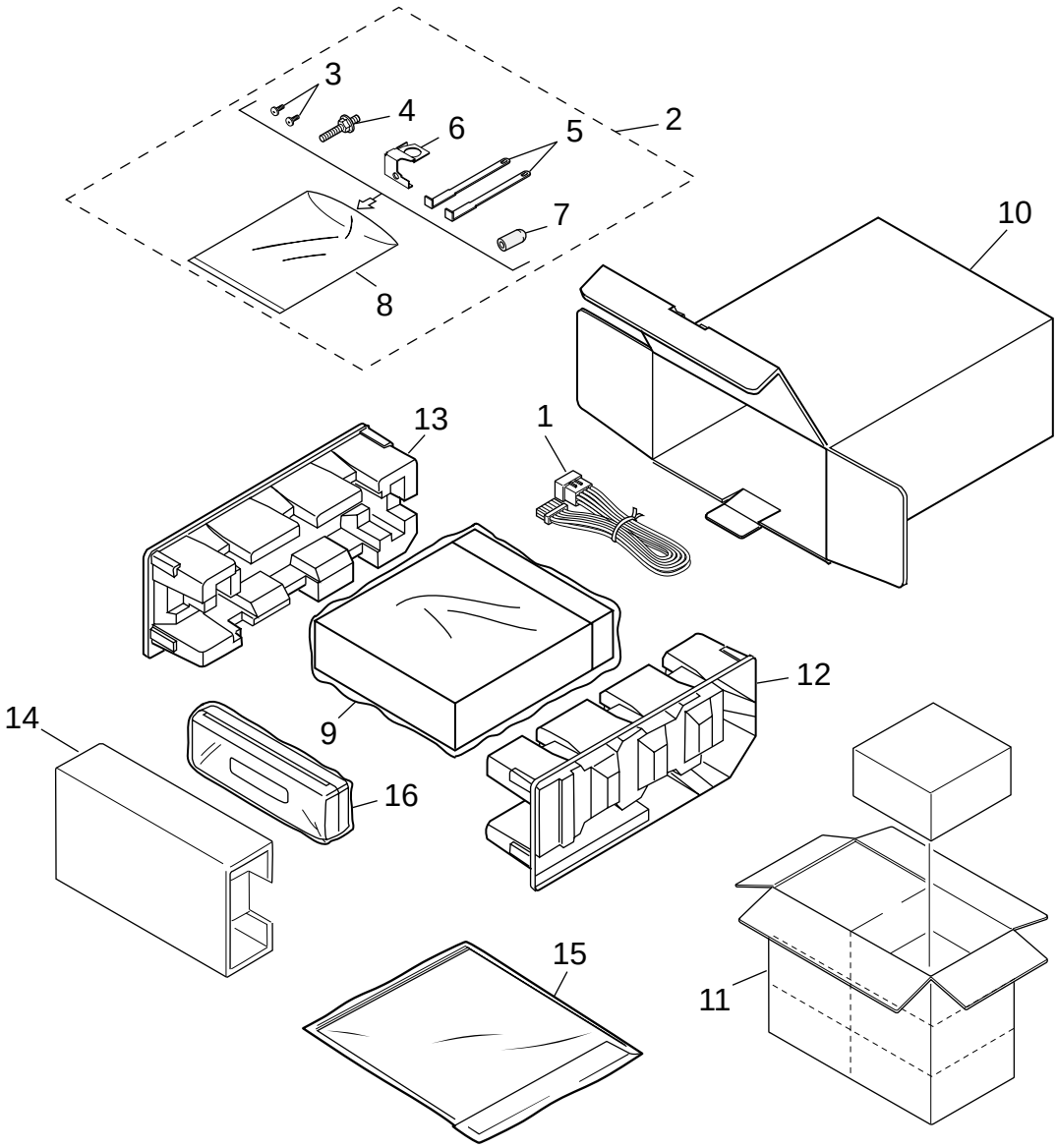


**4. Specifications of Laser Diode**

Specifications of laser radiation fields to which human access is possible during service.
Wavelength = 800 nanometers

# 2. EXPLODED VIEWS AND PARTS LIST

## 2.1 PACKING



**NOTE:**

- Parts marked by "*" are generally unavailable because they are not in our Master Spare Parts List.
- Screws adjacent to ∇ mark on the product are used for disassembly.
- For the applying amount of lubricants or glue, follow the instructions in this manual.
  ( In the case of no amount instructions, apply as you think it appropriate.)

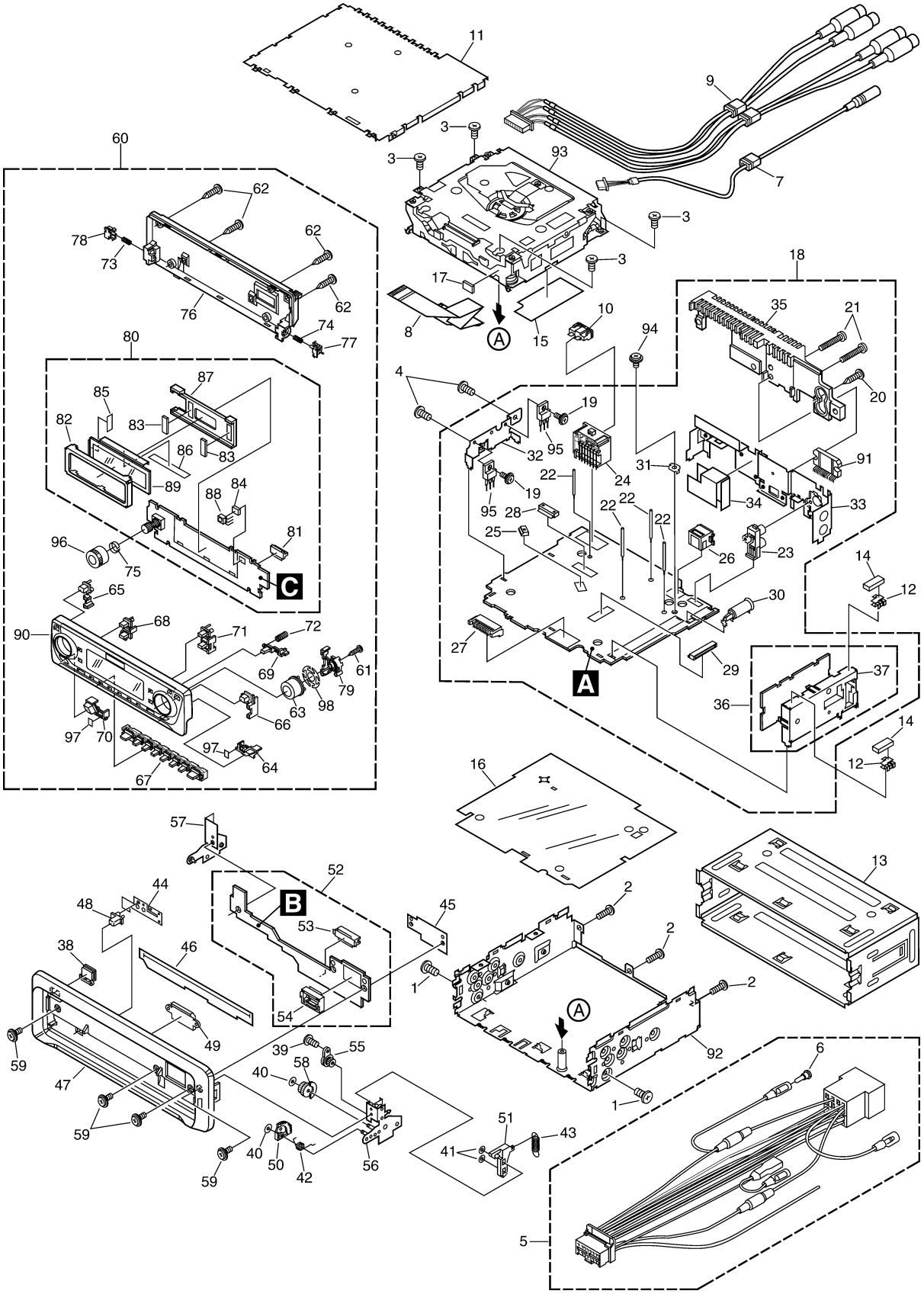
## ● PACKING SECTION PARTS LIST

| Mark | No. | Description | Part No. |
|---|---|---|---|
| | 1 | Cord Assy | CDE6435 |
| | 2 | Accessory Assy | CEA3062 |
| | 3 | Screw | BPZ20P060FZK |
| | 4 | Screw | CBA1002 |
| | 5 | Handle | CNC5395 |
| | 6 | Earth Plate | CNC9450 |
| | 7 | Bush | CNV3930 |
| * | 8 | Polyethylene Bag | E36-615 |
| | 9 | Polyethylene Bag | CEG-162 |
| | 10 | Carton | CHG4613 |
| | 11 | Contain Box | CHL4613 |
| | 12 | Protector | CHP2251 |
| | 13 | Protector | CHP2252 |
| | 14 | Inner Box | CHW1754 |
| | 15-1 | Owner's Manual | CRD3506 |
| | 15-2 | Owner's Manual | CRD3507 |
| | 15-3 | Owner's Manual | CRD3508 |
| | 15-4 | Installation Manual | CRD3525 |
| * | 15-5 | Caution Card | CRP1207 |
| * | 15-6 | Passport | CRY1013 |
| * | 15-7 | Warranty Card | CRY1157 |
| | 15-8 | Polyethylene Bag | CEG1116 |
| | 16 | Case Assy | CXB3520 |

## ● Owner's Manual, Installation Manual

| Part No. | Language |
|---|---|
| CRD3506 | English, Spanish |
| CRD3507 | German, French |
| CRB3508 | Italian, Dutch |
| CRD3525 | English, Spanish, German, French, Italian, Dutch |

## 2.2 EXTERIOR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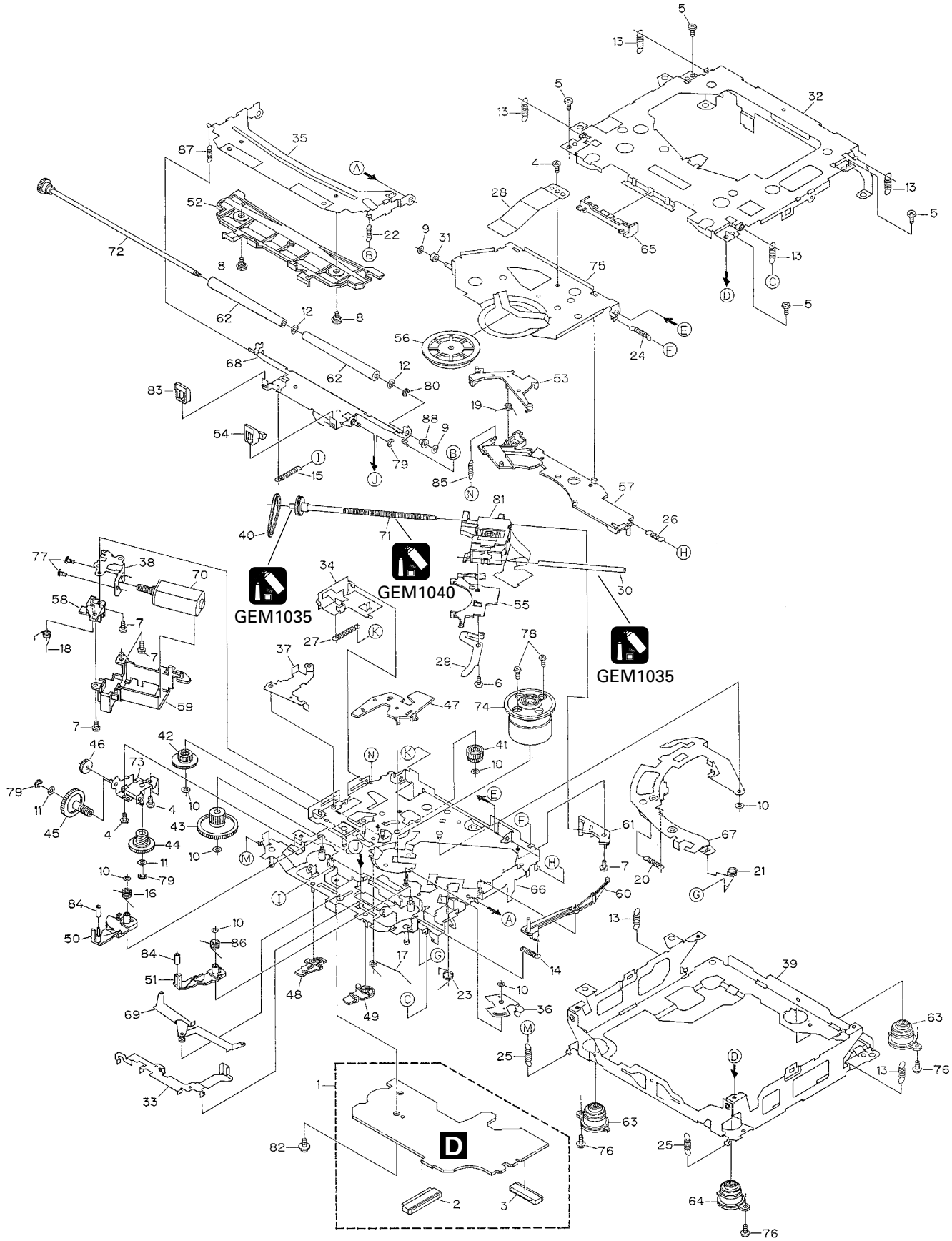
## ● EXTERIOR SECTION PARTS LIST

| Mark | No. | Description | Part No. |
|---|---|---|---|
| | 1 | Screw | BMZ30P040FZK |
| | 2 | Screw | BMZ30P100FMC |
| | 3 | Screw | BSZ26P060FMC |
| | 4 | Screw | BSZ30P040FMC |
| | 5 | Cord Assy | CDE6435 |
| | 6 | Cap | CKX-003 |
| | 7 | Cord Assy | CDE6717 |
| | 8 | Cable | CDE6718 |
| | 9 | Cord Assy | CDE6747 |
| | 10 | Fuse(10A) | CEK1136 |
| | 11 | Case | CNB2686 |
| | 12 | Holder | CNC5704 |
| | 13 | Holder | CNC8659 |
| | 14 | Cushion | CNM4870 |
| | 15 | Insulator | CNM7214 |
| | 16 | Insulator | CNM7629 |
| | 17 | Insulator | CNM7682 |
| | 18 | Tuner Amp Unit | CWM7982 |
| | 19 | Screw | ASZ26P060FMC |
| | 20 | Screw | BPZ26P120FMC |
| | 21 | Screw | BSZ26P160FMC |
| | 22 | Clamper | CEF1007 |
| | 23 | Pin Jack(CN351) | CKB1035 |
| | 24 | Plug(CN901) | CKM1330 |
| | 25 | Plug(CN451) | CKS1049 |
| | 26 | Connector(CN101) | CKS3408 |
| | 27 | Plug(CN801) | CKS3537 |
| | 28 | Connector(CN352) | CKS3602 |
| | 29 | Connector(CN653) | CKS3833 |
| | 30 | Antenna Jack(CN401) | CKX1056 |
| | 31 | Holder | CNC5399 |
| | 32 | Holder | CNC8615 |
| | 33 | Holder | CNC9468 |
| | 34 | Insulator | CNM6949 |
| | 35 | Heat Sink | CNR1583 |
| | 36 | FM/AM Tuner Unit | CWE1562 |
| | 37 | Holder | CNC8815 |
| | 38 | Button(EJECT) | CAC6839 |
| | 39 | Screw(M2x2) | CBA1176 |
| | 40 | Washer | CBF1038 |
| | 41 | Washer | CBF1039 |
| | 42 | Spring | CBH2428 |
| | 43 | Spring | CBH2429 |
| | 44 | Spring | CBL1512 |
| | 45 | Holder | CNC9096 |
| | 46 | Cover | CNM6854 |
| | 47 | Panel | CNS6930 |
| | 48 | Pin | CNV6486 |
| | 49 | Lighting Conductor | CNV6487 |
| | 50 | Gear | CNV6507 |
| | 51 | Arm | CNV6508 |
| | 52 | Panel Unit | CWM7986 |
| | 53 | Socket(CN1850) | CKS3550 |
| | 54 | Connector(CN1851) | CKS4462 |
| | 55 | Damper Unit | CXB5070 |
| | 56 | Holder Unit | CXB6356 |
| | 57 | Holder Unit | CXB6357 |
| | 58 | Clutch Unit | CXB6358 |
| | 59 | Screw | IMS20P045FZK |
| | 60 | Detach Grille Assy | CXB7912 |
| | 61 | Screw | BPZ20P080FMC |
| | 62 | Screw | BPZ20P100FZK |
| | 63 | Button(SELECT) | CAC7220 |
| | 64 | Button(SFEQ) | CAC7221 |
| | 65 | Button(TA) | CAC7223 |
| | 66 | Button(AUDIO) | CAC7224 |
| | 67 | Button(1-6) | CAC7225 |
| | 68 | Button(DISP) | CAC7226 |
| | 69 | Button(OPEN) | CAC7227 |
| | 70 | Button(EQ) | CAC7231 |
| | 71 | Button(FUNC) | CAC7489 |
| | 72 | Spring | CBH2630 |
| | 73 | Spring | CBH2431 |
| | 74 | Spring | CBH2430 |
| | 75 | Spring | CBL1470 |
| | 76 | Cover | CNS6740 |
| | 77 | Holder | CNV6505 |
| | 78 | Holder | CNV6506 |
| | 79 | Holder | CNV6909 |
| | 80 | Keyboard Unit | CWM7988 |
| | 81 | Connector(CN1901) | CKS4524 |
| | 82 | Holder | CNC9642 |
| | 83 | Cushion | CNM6633 |
| | 84 | Cushion | CNM7469 |
| | 85 | Spacer | CNM7697 |
| | 86 | Spacer | CNM7698 |
| | 87 | Holder | CNV6910 |
| | 88 | IC(IC1903) | TSOP1840SB3V |
| | 89 | OEL Unit | MXS8017 |
| | 90 | Sub Grille Assy | CXB8814 |
| | 91 | IC(IC301) | PAL007A |
| | 92 | Chassis Unit | CXB8479 |
| | 93 | CD Mechanism Module(S9MP3) | CXK5555 |
| | 94 | Screw | ISS26P055FUC |
| | 95 | Transistor(Q921,999) | 2SD2396 |
| * | 96 | Knob | CAA2697 |
| | 97 | Spacer | CNM7807 |
| | 98 | Cushion | CNM7808 |

## 2.3 CD MECHANISM MODULE

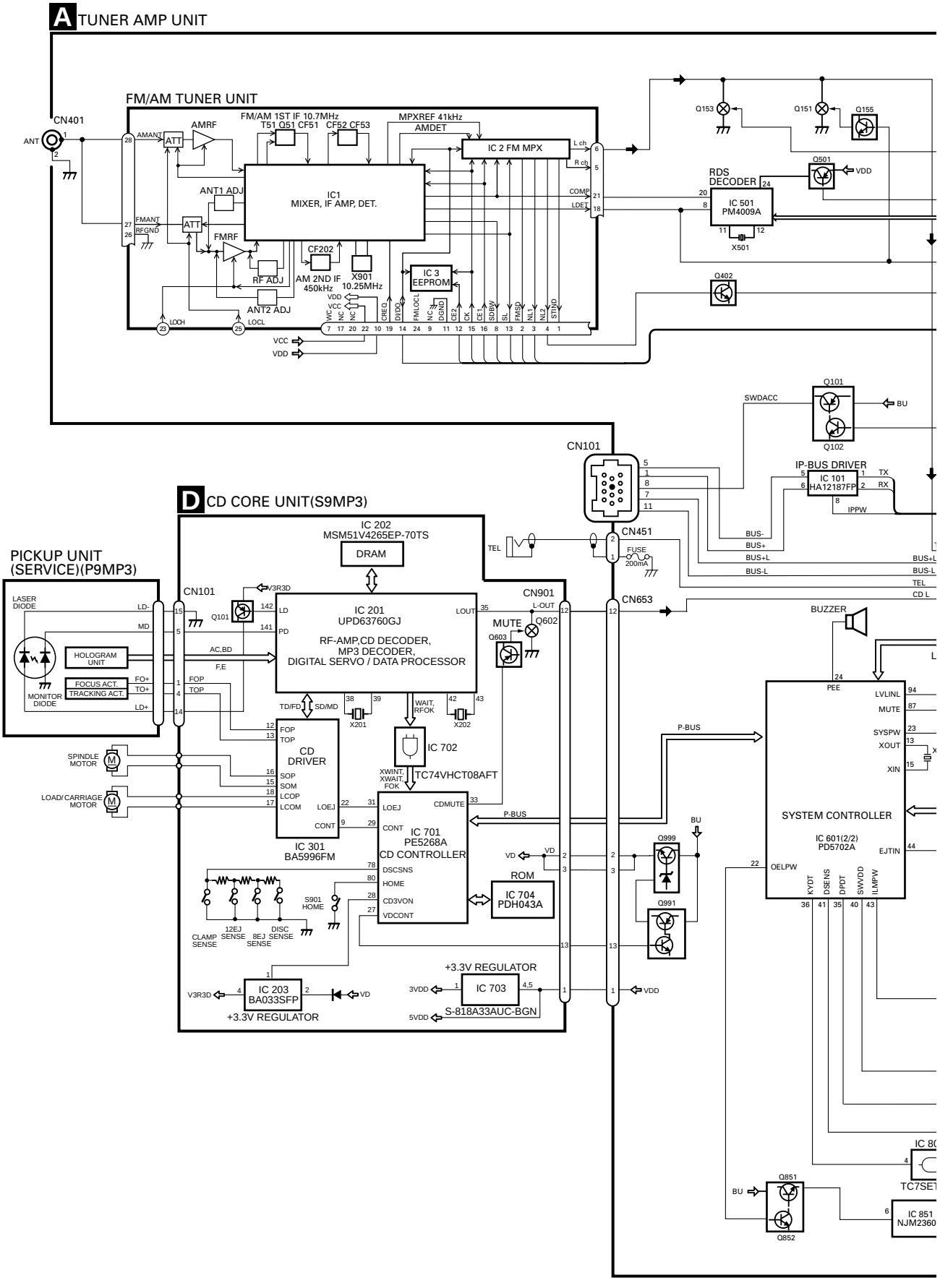


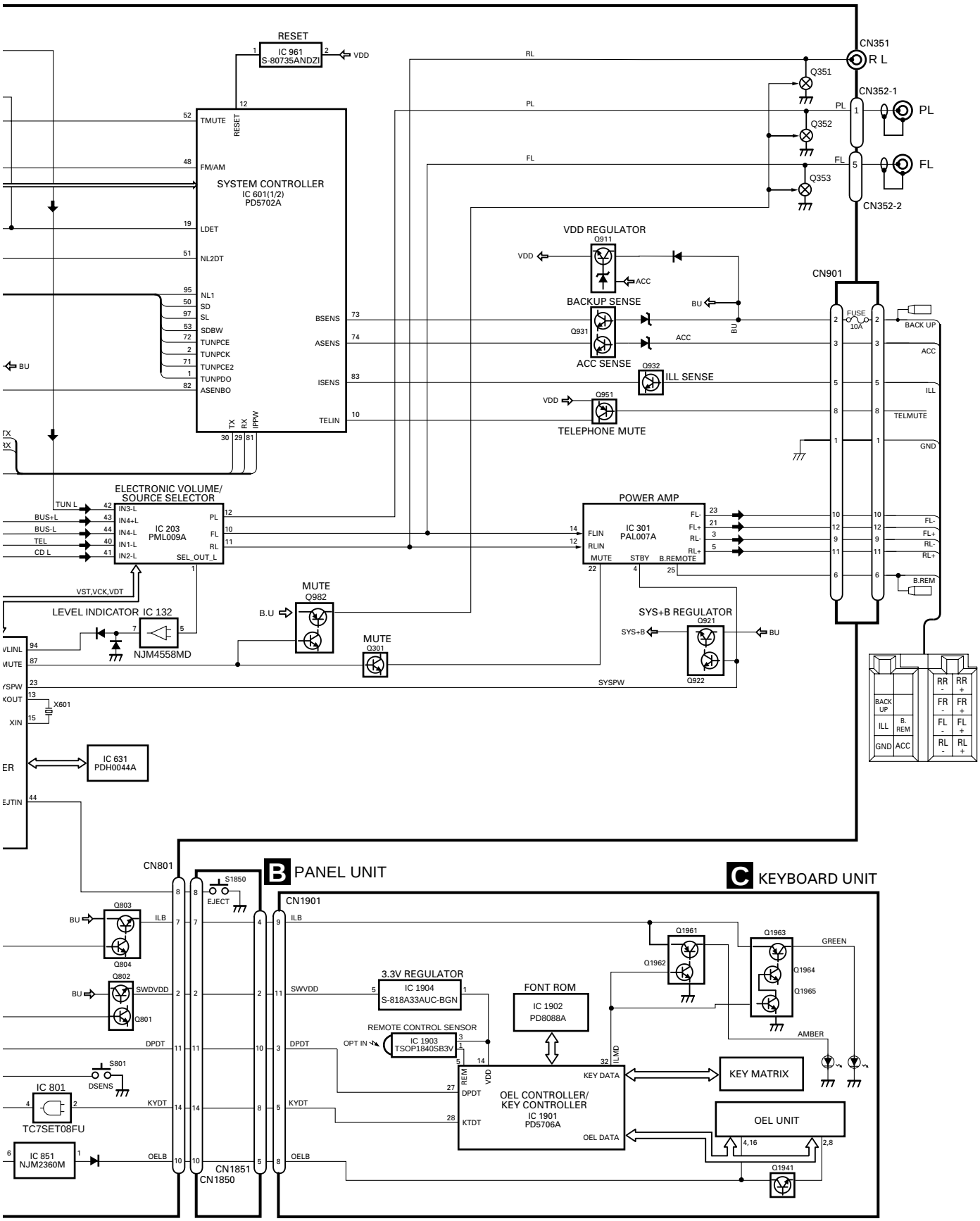
## ● CD MECHANISM MODULE SECTION PARTS LIST

| Mark | No. | Description | Part No. |
|---|---|---|---|
| | 1 | CD Core Unit(S9MP3) | CWX2617 |
| | 2 | Connector(CN901) | CKS4186 |
| | 3 | Connector(CN101) | CKS3486 |
| | 4 | Screw | BMZ20P025FMC |
| | 5 | Screw | BSZ20P040FMC |
| | 6 | Screw(M2x4) | CBA1362 |
| | 7 | Screw(M2x3) | CBA1527 |
| | 8 | Screw | CBA1545 |
| | 9 | Washer | CBF1037 |
| | 10 | Washer | CBF1038 |
| | 11 | Washer | CBF1039 |
| | 12 | Washer | CBF1060 |
| | 13 | Spring | CBH2378 |
| | 14 | Spring | CBH2379 |
| | 15 | Spring | CBH2514 |
| | 16 | Spring | CBH2533 |
| | 17 | Spring | CBH2382 |
| | 18 | Spring | CBH2383 |
| | 19 | Spring | CBH2384 |
| | 20 | Spring | CBH2527 |
| | 21 | Spring | CBH2386 |
| | 22 | Spring | CBH2537 |
| | 23 | Spring | CBH2390 |
| | 24 | Spring | CBH2391 |
| | 25 | Spring | CBH2523 |
| | 26 | Spring | CBH2426 |
| | 27 | Spring | CBH2444 |
| | 28 | Spring | CBL1561 |
| | 29 | Spring | CBL1553 |
| | 30 | Shaft | CLA3845 |
| | 31 | Roller | CLA3910 |
| | 32 | Frame | CNC9654 |
| | 33 | Lever | CNC9664 |
| | 34 | Lever | CNC8949 |
| | 35 | Arm | CNC9661 |
| | 36 | Arm | CNC9016 |
| | 37 | Arm | CNC9017 |
| | 38 | Bracket | CNC9123 |
| | 39 | Frame | CNC9656 |
| | 40 | Belt | CNT1086 |
| | 41 | Gear | CNV6886 |
| | 42 | Gear | CNV6316 |
| | 43 | Gear | CNV6317 |
| | 44 | Gear | CNV6318 |
| | 45 | Gear | CNV6319 |
| | 46 | Gear | CNV6320 |
| | 47 | Arm | CNV6322 |
| | 48 | Arm | CNV6323 |
| | 49 | Arm | CNV6324 |
| | 50 | Arm | CNV6888 |
| | 51 | Arm | CNV6889 |
| | 52 | Guide | CNV6327 |
| | 53 | Arm | CNV6924 |
| | 54 | Guide | CNV6921 |
| | 55 | Rack | CNV6923 |
| | 56 | Clamper | CNV6331 |
| | 57 | Arm | CNV6332 |
| | 58 | Guide | CNV6333 |
| | 59 | Cover | CNV6334 |
| | 60 | Arm | CNV6335 |
| | 61 | Guide | CNV6336 |
| | 62 | Roller | CNV6338 |
| | 63 | Damper | CNV6175 |
| | 64 | Damper | CNV6662 |
| | 65 | Guide | CNV6925 |
| | 66 | Chassis Unit | CXB7980 |
| * | 67 | Arm Unit | CXB7983 |
| | 68 | Arm Unit | CXB7984 |
| | 69 | Arm Unit | CXB7985 |
| | 70 | Motor Unit(M2) | CXB5903 |
| | 71 | Screw Unit | CXB5904 |
| | 72 | Gear Unit | CXB8076 |
| | 73 | Bracket Unit | CXB7982 |
| | 74 | Motor Unit(M1) | CXB6007 |
| | 75 | Arm Unit | CXB8504 |
| | 76 | Screw(M2x5) | EBA1028 |
| | 77 | Screw | JFZ20P020FMC |
| | 78 | Screw | JGZ17P020FZK |
| | 79 | Washer | YE15FUC |
| | 80 | Washer | YE20FUC |
| | 81 | Pickup Unit(Service)(P9MP3) | CXX1550 |
| | 82 | Screw | IMS26P030FMC |
| | 83 | Guide | CNV6922 |
| | 84 | Roller | CNV6887 |
| | 85 | Spring | CBH2509 |
| | 86 | Spring | CBH2512 |
| | 87 | Spring | CBH2536 |
| | 88 | Collar | CNV6906 |

# 3. BLOCK DIAGRAM AND SCHEMATIC DIAGRAM

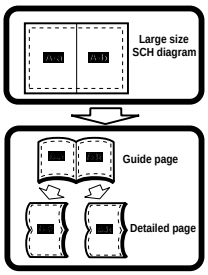
## 3.1 BLOCK DIAGRAM

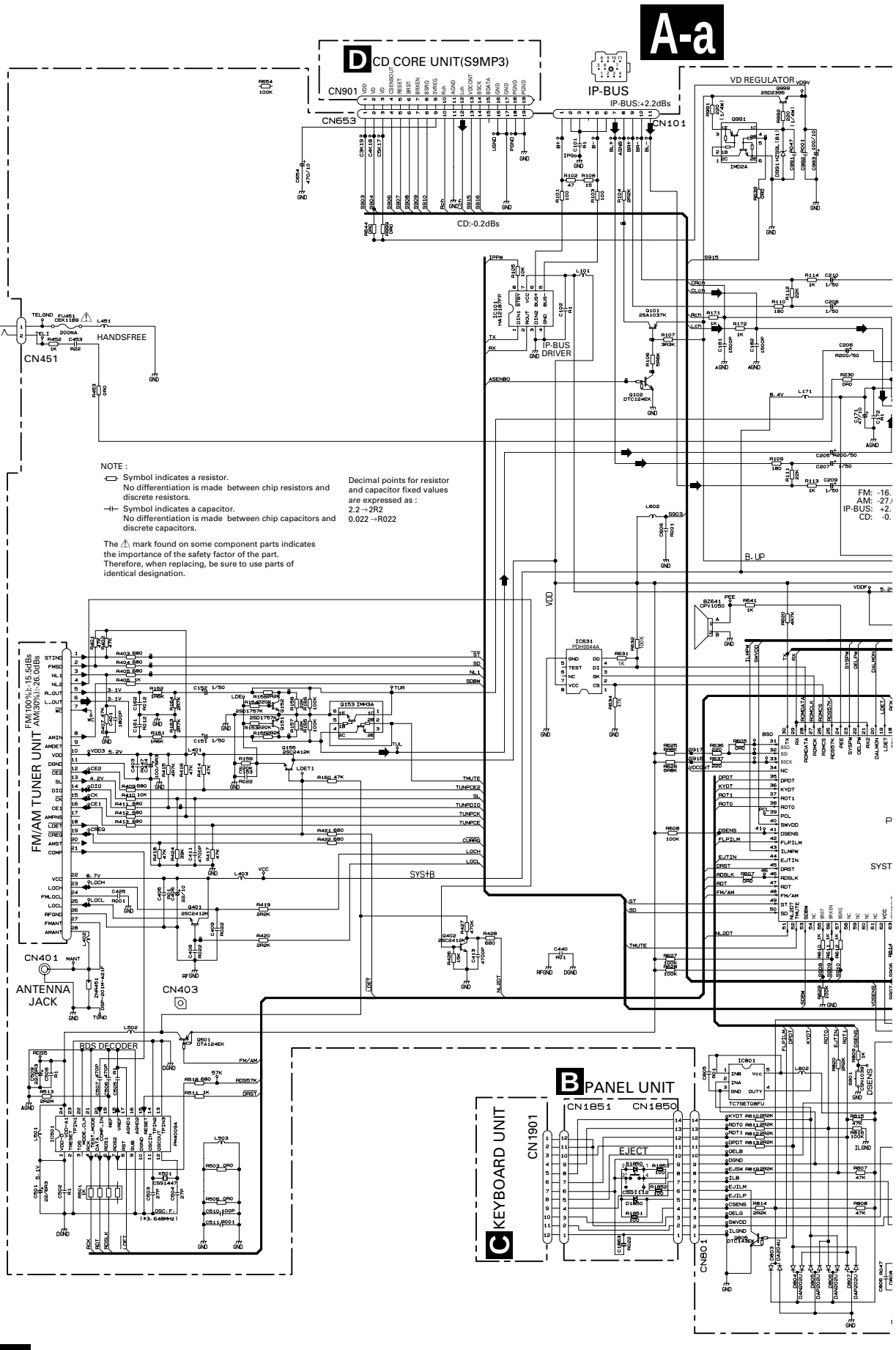



RESET
IC 961
S-80735ANDZI
VDD
SYSTEM CONTROLLER
IC 601(1/2)
PD5702A
TMUTE
FM/AM
LDET
NL2DT
NL1
SD
SL
SDBW
TUNPCE
TUNPCK
TUNPCE2
TUNPDO
ASENBO
BSENS
ASENS
ISENS
TELIN
CN351
R L
Q351
Q352
Q353
CN352-1
CN352-2
PL
FL
VDD REGULATOR
Q911
ACC
BACKUP SENSE
Q931
ACC SENSE
Q932
ILL SENSE
Q951
TELEPHONE MUTE
CN901
FUSE
10A
BACK UP
ILL
TELMUTE
GND
ELECTRONIC VOLUME/
SOURCE SELECTOR
IC 203
PML009A
TUN L
BUS+L
BUS-L
TEL
CD L
VST,VCK,VDT
LEVEL INDICATOR IC 132
NJM4558MD
MUTE
Q982
Q301
POWER AMP
IC 301
PAL007A
FLIN
RLIN
MUTE
STBY
B.REMOTE
SYS+B REGULATOR
Q921
Q922
SYSPW
X601
IC 631
PDH0044A
CN801
S1850
EJECT
B PANEL UNIT
CN1901
Q803
Q804
Q802
Q801
S801
DSENS
IC 801
TC7SET08FU
IC 851
NJM2360M
CN1851
CN1850
3.3V REGULATOR
IC 1904
S-818A33AUC-BGN
FONT ROM
IC 1902
PD8088A
REMOTE CONTROL SENSOR
IC 1903
TSOP1840SB3V
OPT IN
OEL CONTROLLER/
KEY CONTROLLER
IC 1901
PD5706A
KEY DATA
OEL DATA
KEY MATRIX
OEL UNIT
C KEYBOARD UNIT
Q1961
Q1962
Q1963
Q1964
Q1965
Q1941
GREEN
AMBER

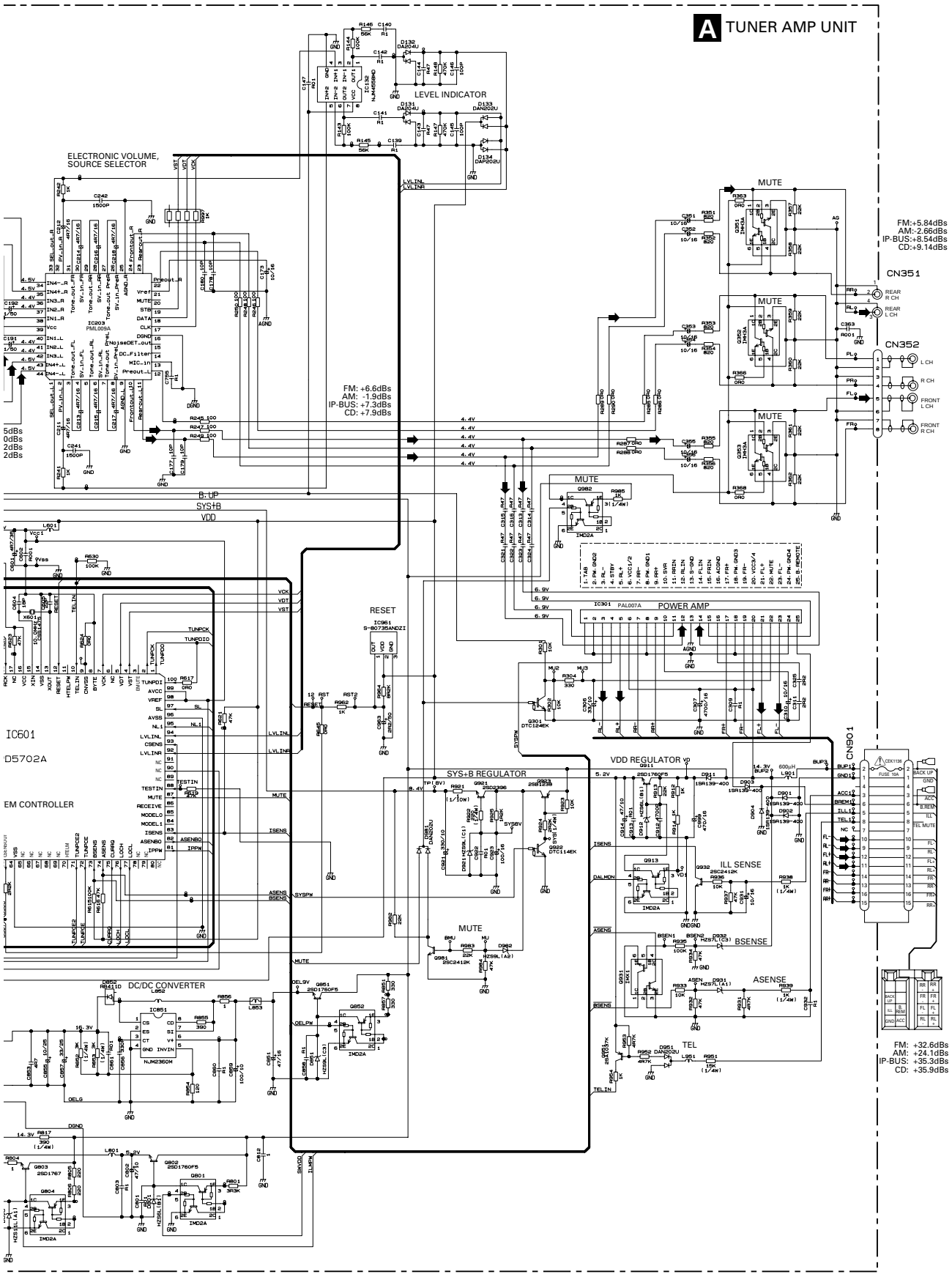
# 3.2 OVERALL CONNECTION DIAGRAM(GUIDE PAGE)

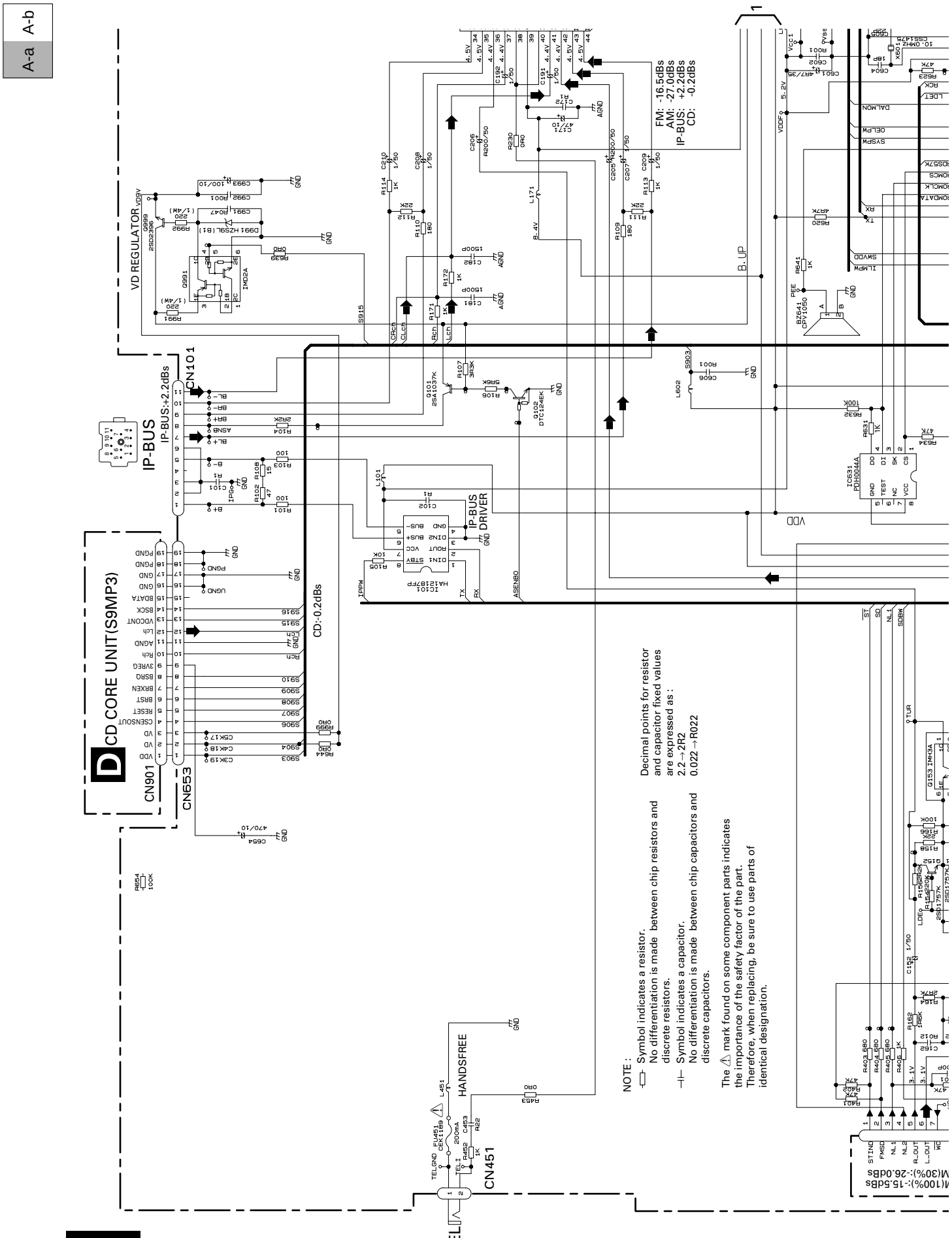
**Note: When ordering service parts, be sure to refer to "EXPLODED VIEWS AND PARTS LIST" or "ELECTRICAL PARTS LIST".**

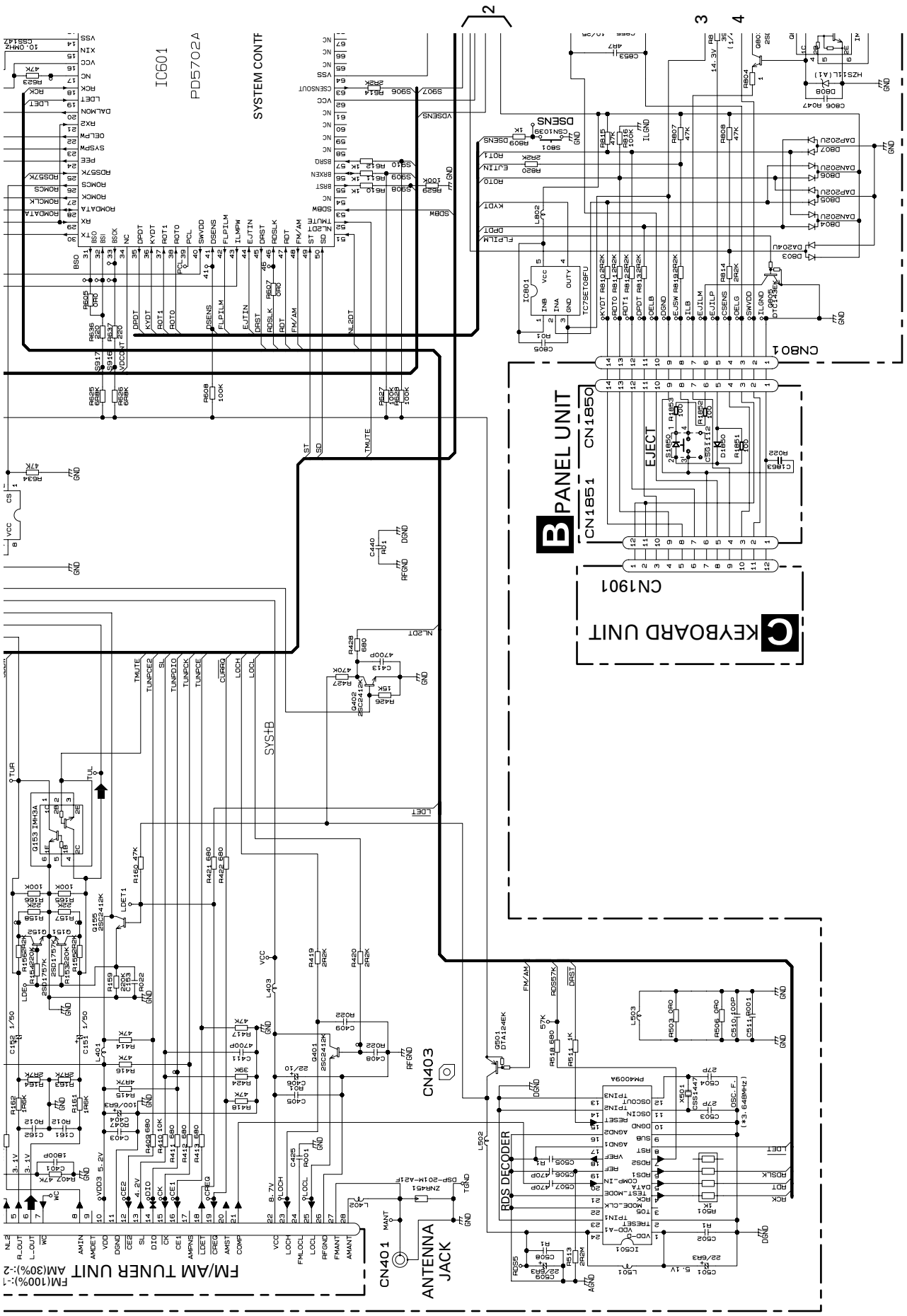


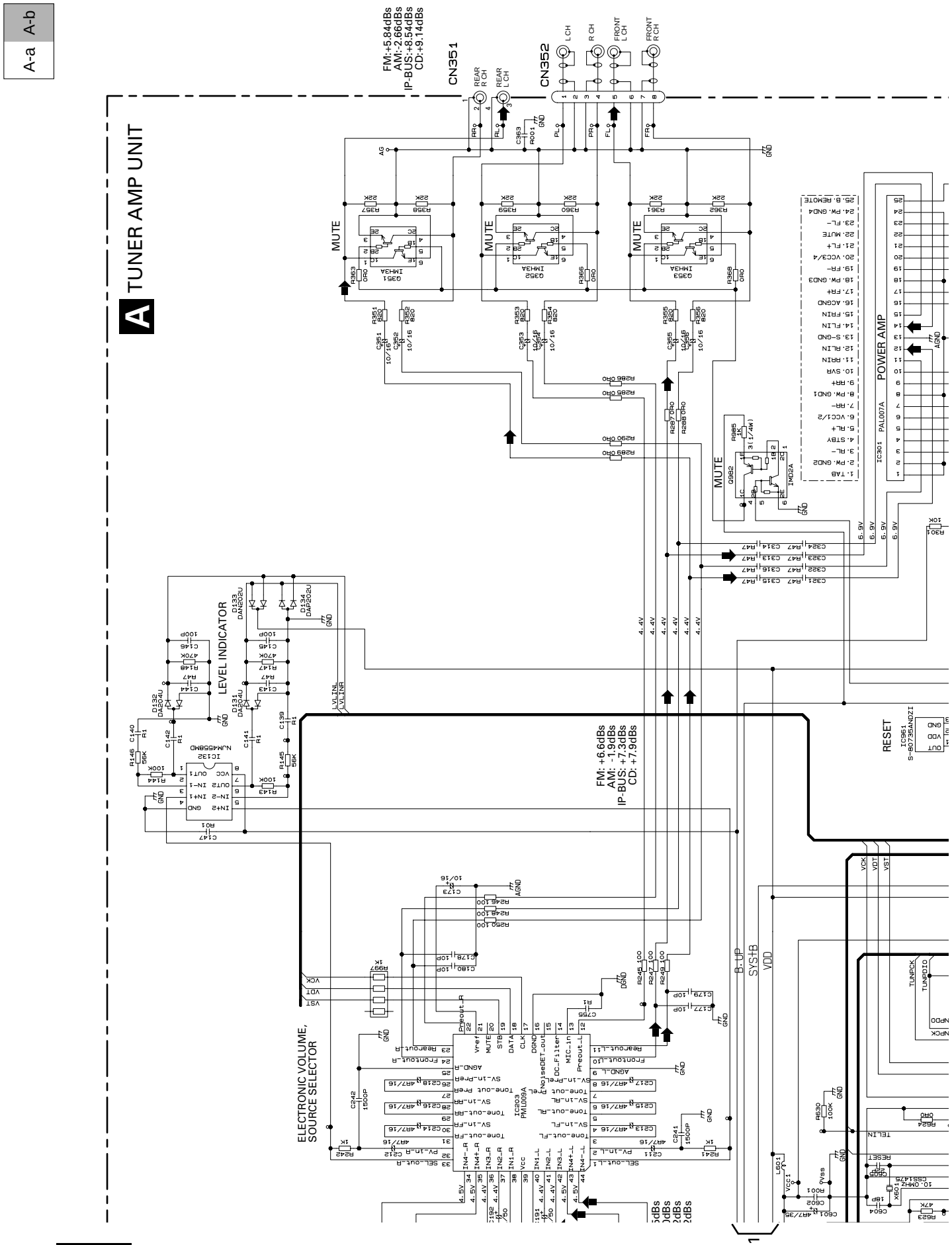



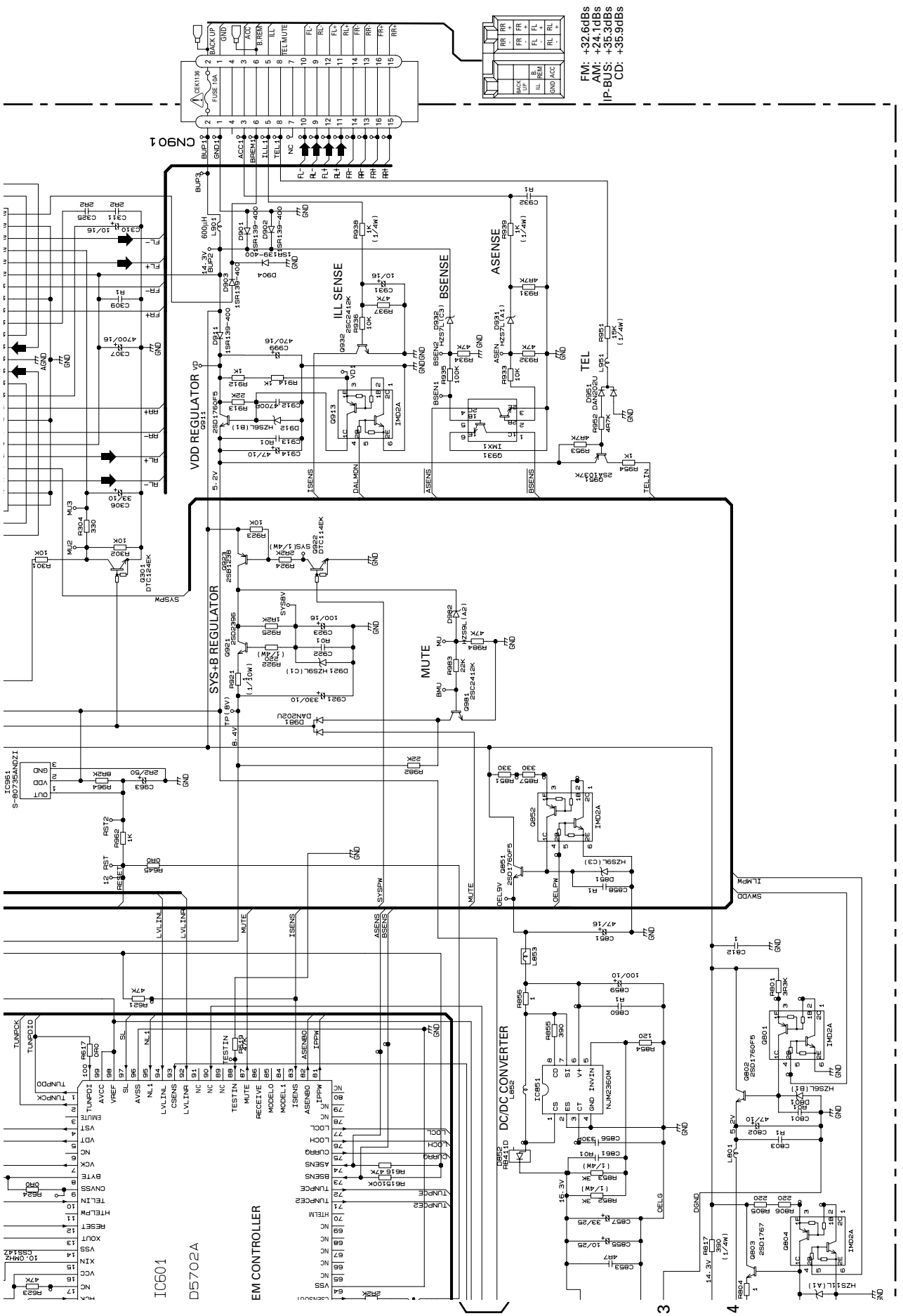
# A-b


A TUNER AMP UNIT
LEVEL INDICATOR
ELECTRONIC VOLUME, SOURCE SELECTOR
IC203 PML008A
MUTE
CN351
CN352
REAR R CH
REAR L CH
L CH
R CH
FRONT L CH
FRONT R CH
FM:+5.84dBs
AM:-2.66dBs
IP-BUS:+8.54dBs
CD:+9.14dBs
FM: +6.6dBs
AM: -1.9dBs
IP-BUS: +7.3dBs
CD: +7.9dBs
B.UP
SYS+B
VDD
RESET
IC961 S-80735ANDZI
IC301 PAL007A
POWER AMP
IC601
D5702A
EM CONTROLLER
SYS+B REGULATOR
VDD REGULATOR
ILL SENSE
BSENSE
ASENSE
TEL
DC/DC CONVERTER
IC851 NJM2360M
CN901
FM: +32.6dBs
AM: +24.1dBs
IP-BUS: +35.3dBs
CD: +35.9dBs

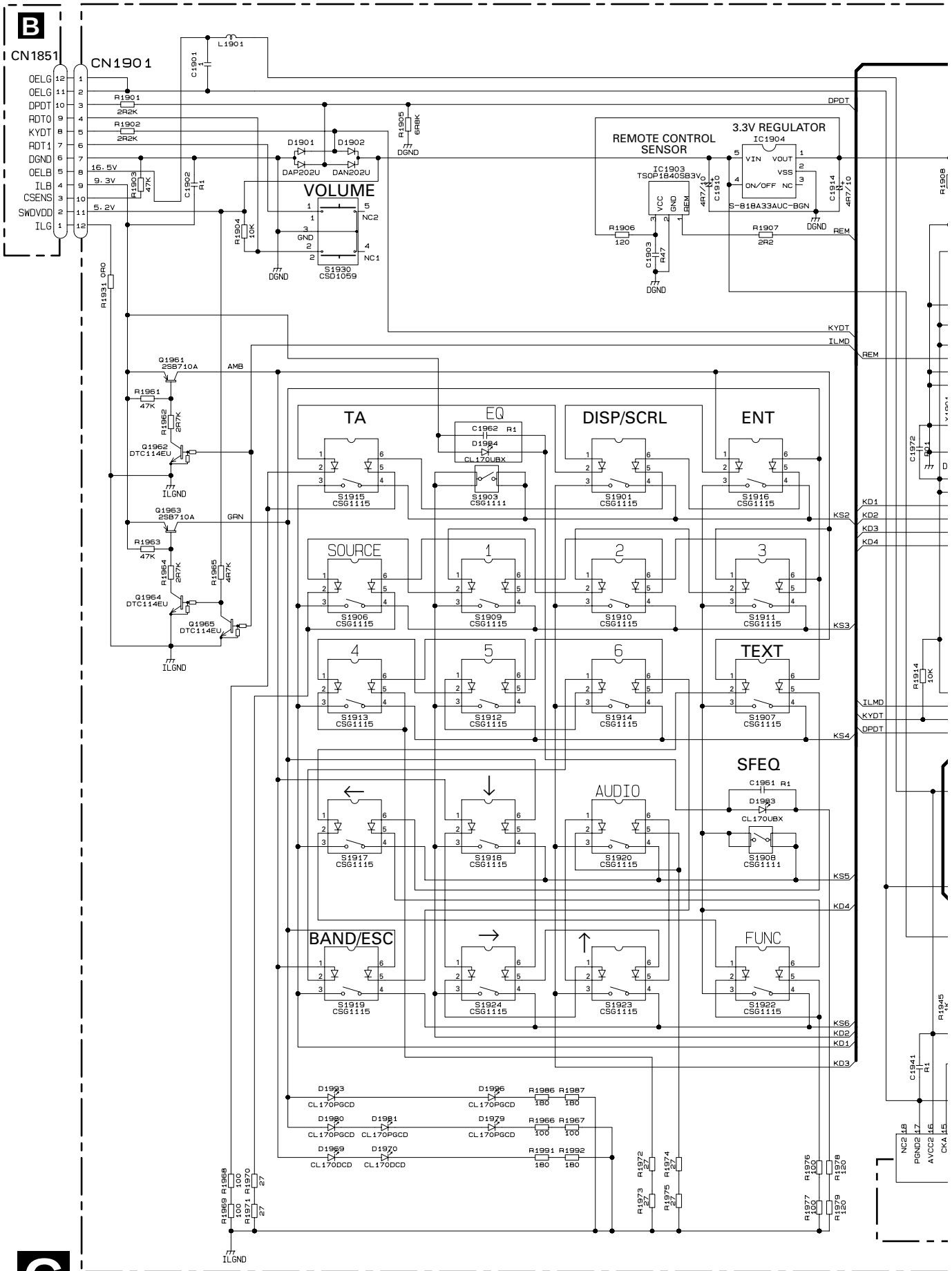

A-b
A-a
VD REGULATOR
IP-BUS
IP-BUS:+2.2dBs
CN101
IP-BUS DRIVER
CD CORE UNIT(S9MP3)
CN901
CN653
CD:-0.2dBs
HANDSFREE
CN451
TEL
FM: -16.5dBs
AM: -27.0dBs
IP-BUS: +2.2dBs
CD: -0.2dBs
B.UP
VDD
NOTE :
Symbol indicates a resistor.
No differentiation is made between chip resistors and discrete resistors.
Symbol indicates a capacitor.
No differentiation is made between chip capacitors and discrete capacitors.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part.
Therefore, when replacing, be sure to use parts of identical designation.
Decimal points for resistor and capacitor fixed values are expressed as :
2.2→2R2
0.022→R022


IC601
PD5702A
SYSTEM CONTF
DSENS
CN801
PANEL UNIT
CN1851
CN1850
EJECT
CN1901
KEYBOARD UNIT
SYS+B
RDS DECODER
CN403
CN401
ANTENNA JACK
FM/AM TUNER UNIT AM(30%):-1
FM(100%):-1

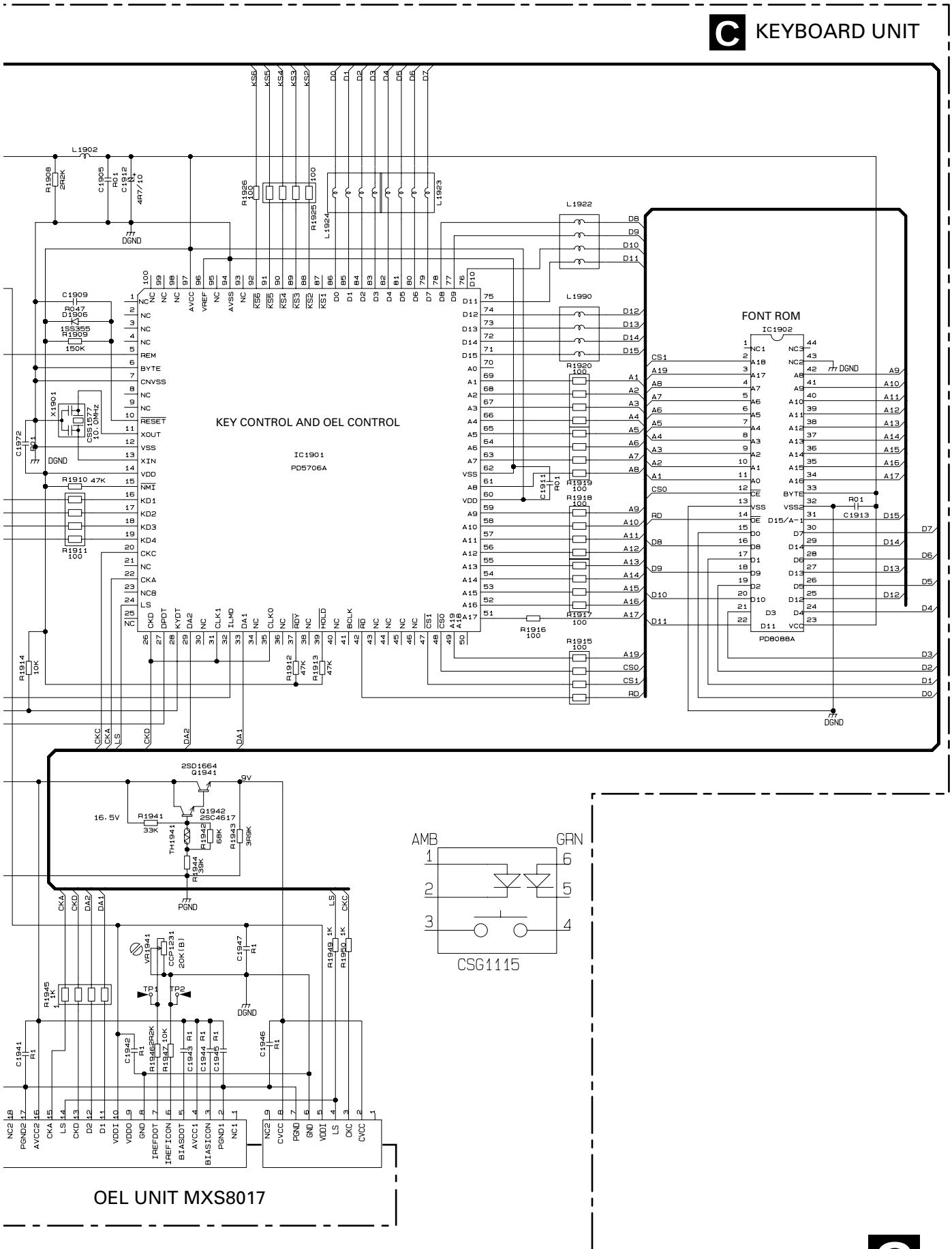

A-b
A-a
A TUNER AMP UNIT
CN351
CN352
REAR R CH
REAR L CH
L CH
R CH
FRONT L CH
FRONT R CH
FM:+5.84dBs
AM:-2.66dBs
IP-BUS:+8.54dBs
CD:+9.14dBs
MUTE
POWER AMP
PAL007A
LEVEL INDICATOR
ELECTRONIC VOLUME, SOURCE SELECTOR
FM:+6.6dBs
AM: - 1.9dBs
IP-BUS: +7.3dBs
CD: +7.9dBs
RESET
S-80735ANDZI
B_UP
SYS+B
VDD
TUNPCK
TUNPDO
TUNPDI
TEL IN
RESET
VCK
VDT
VST


FM: +32.6dBs
AM: +24.1dBs
IP-BUS: +35.3dBs
CD: +35.9dBs
CN901
VDD REGULATOR
SYS+B REGULATOR
MUTE
ILL SENSE
BSENSE
ASENSE
TEL
DC/DC CONVERTER
EM CONTROLLER
IC601
DS702A

## 3.3 KEYBOARD UNIT

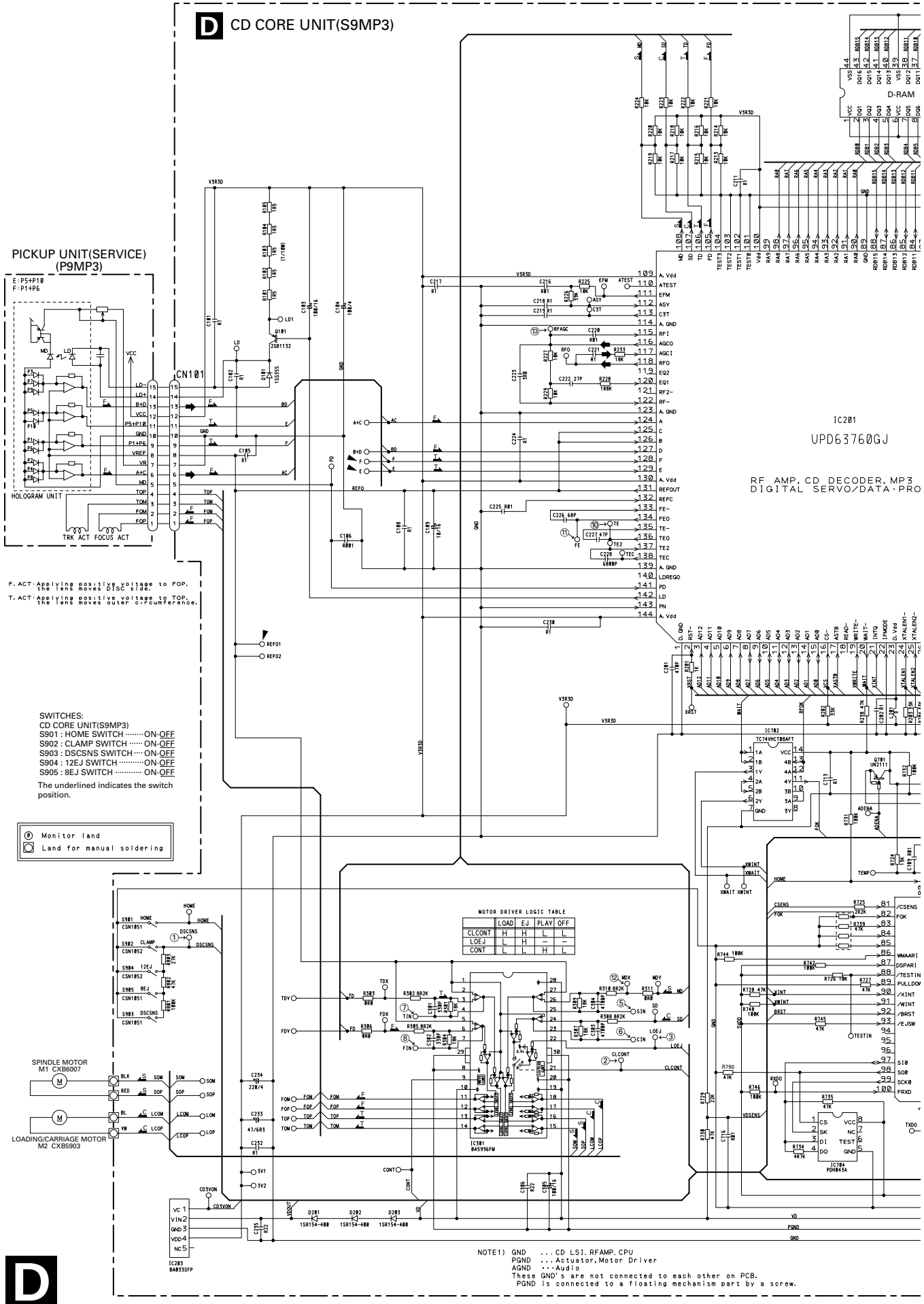


# C KEYBOARD UNIT

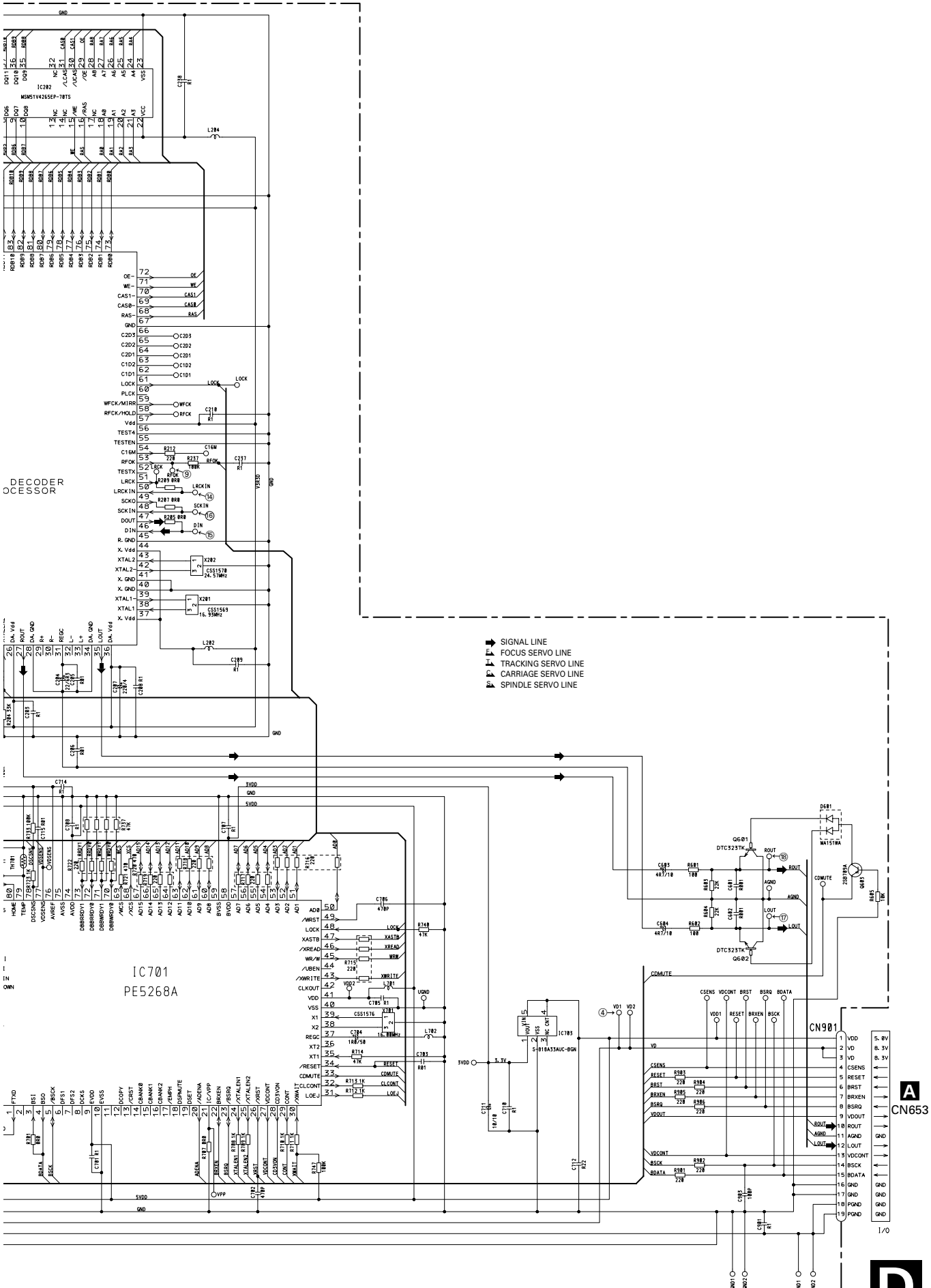


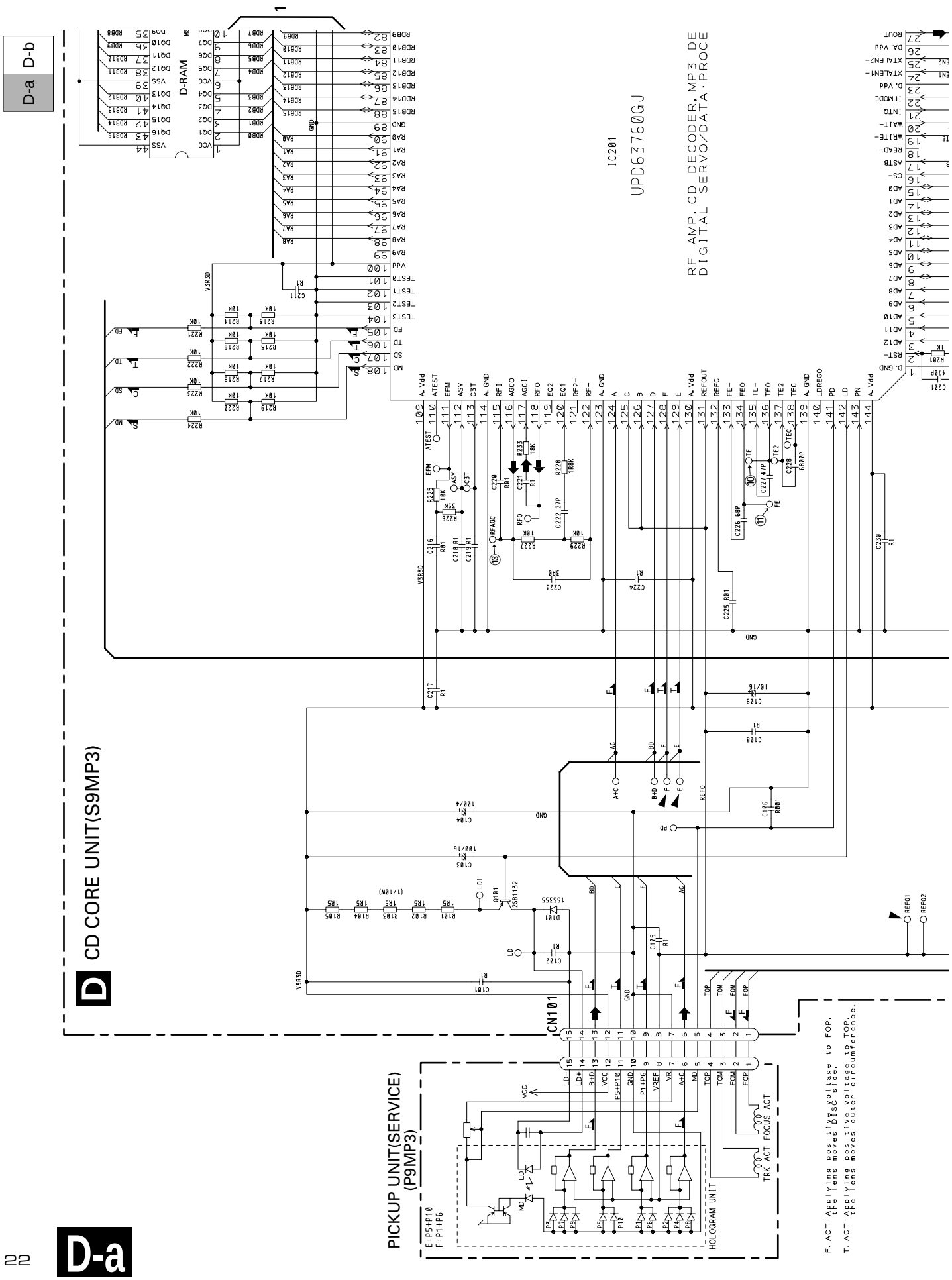
D-a

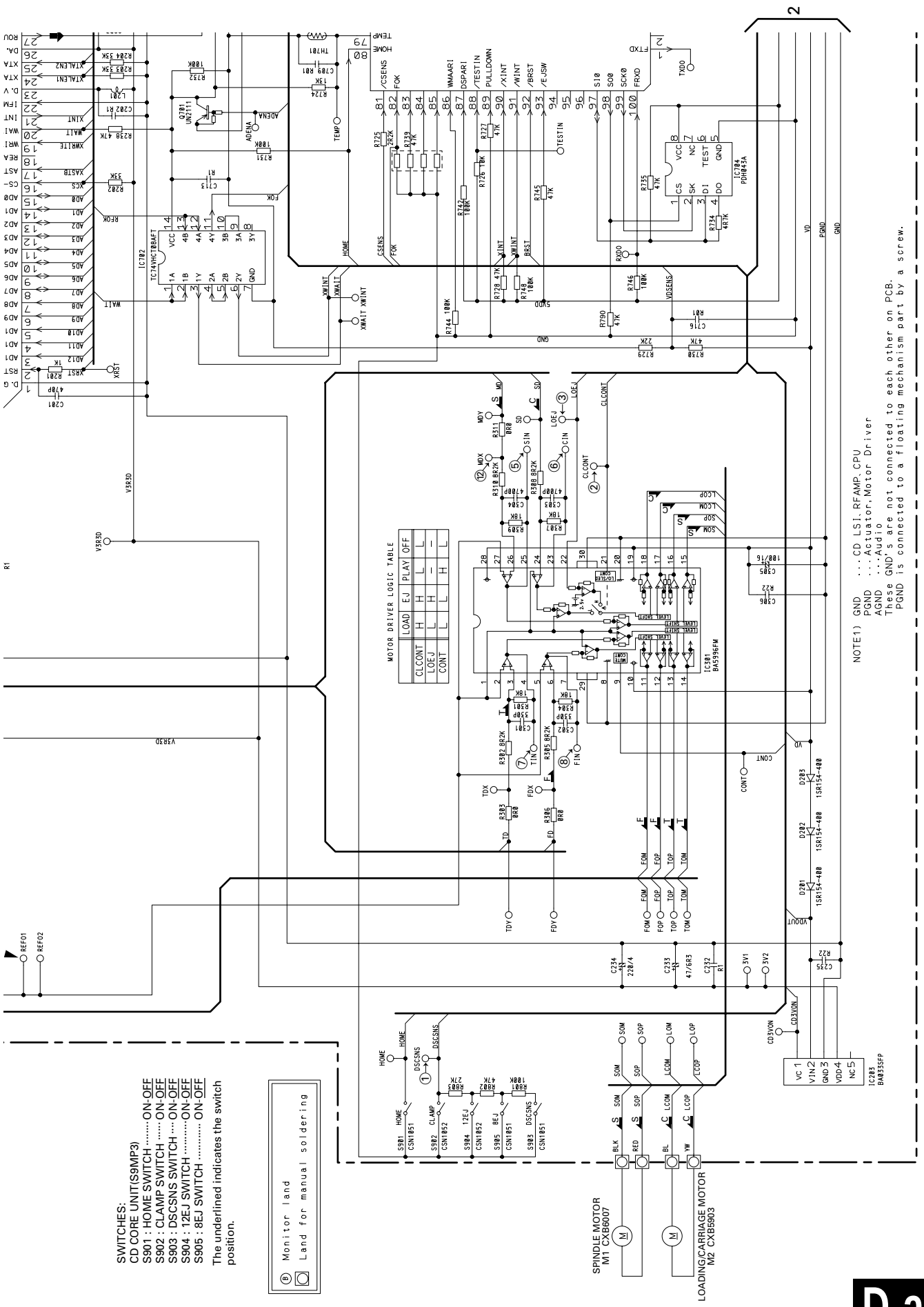
# 3.4 CD MECHANISM MODULE(GUIDE PAGE)



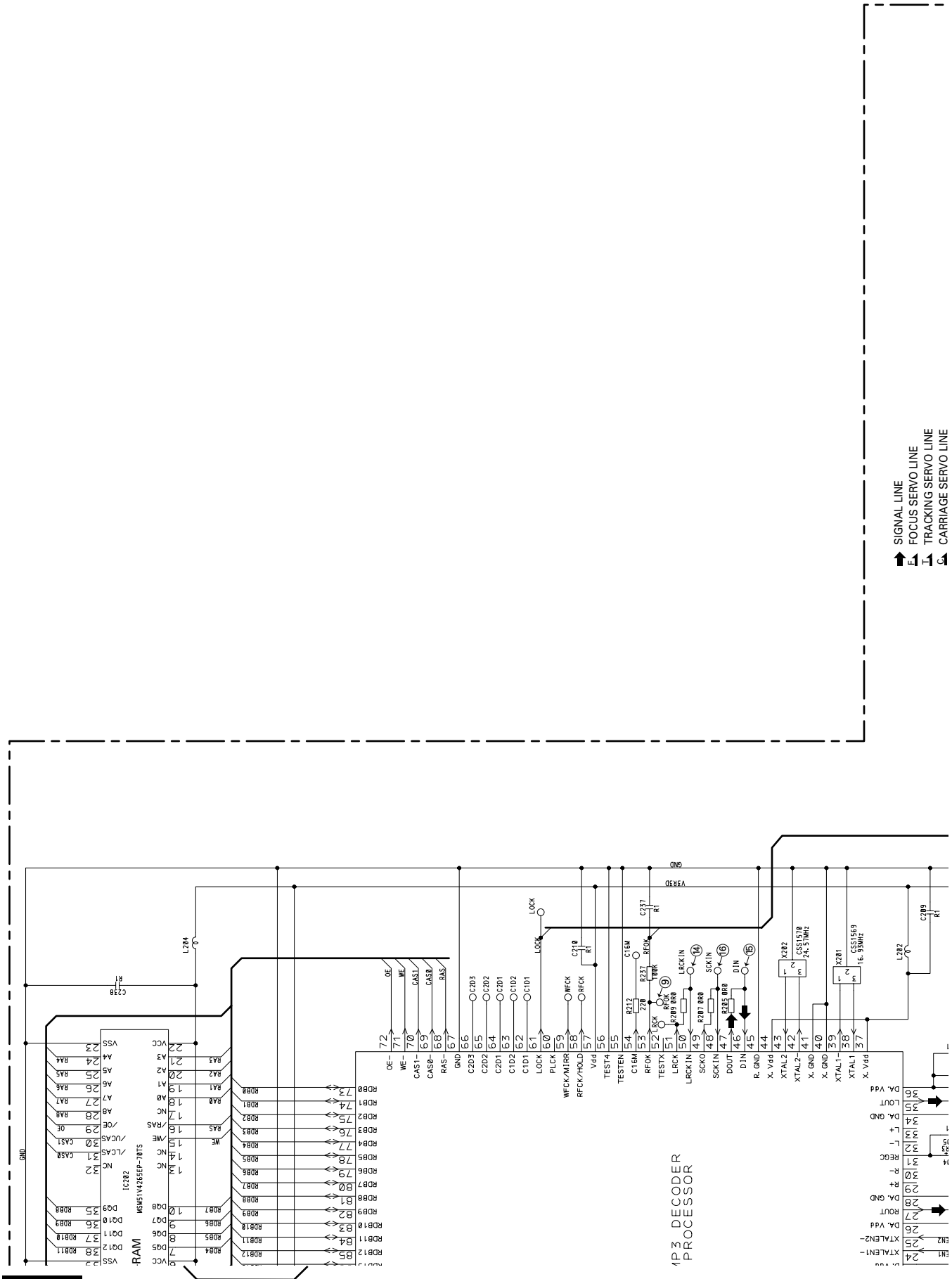
D-b

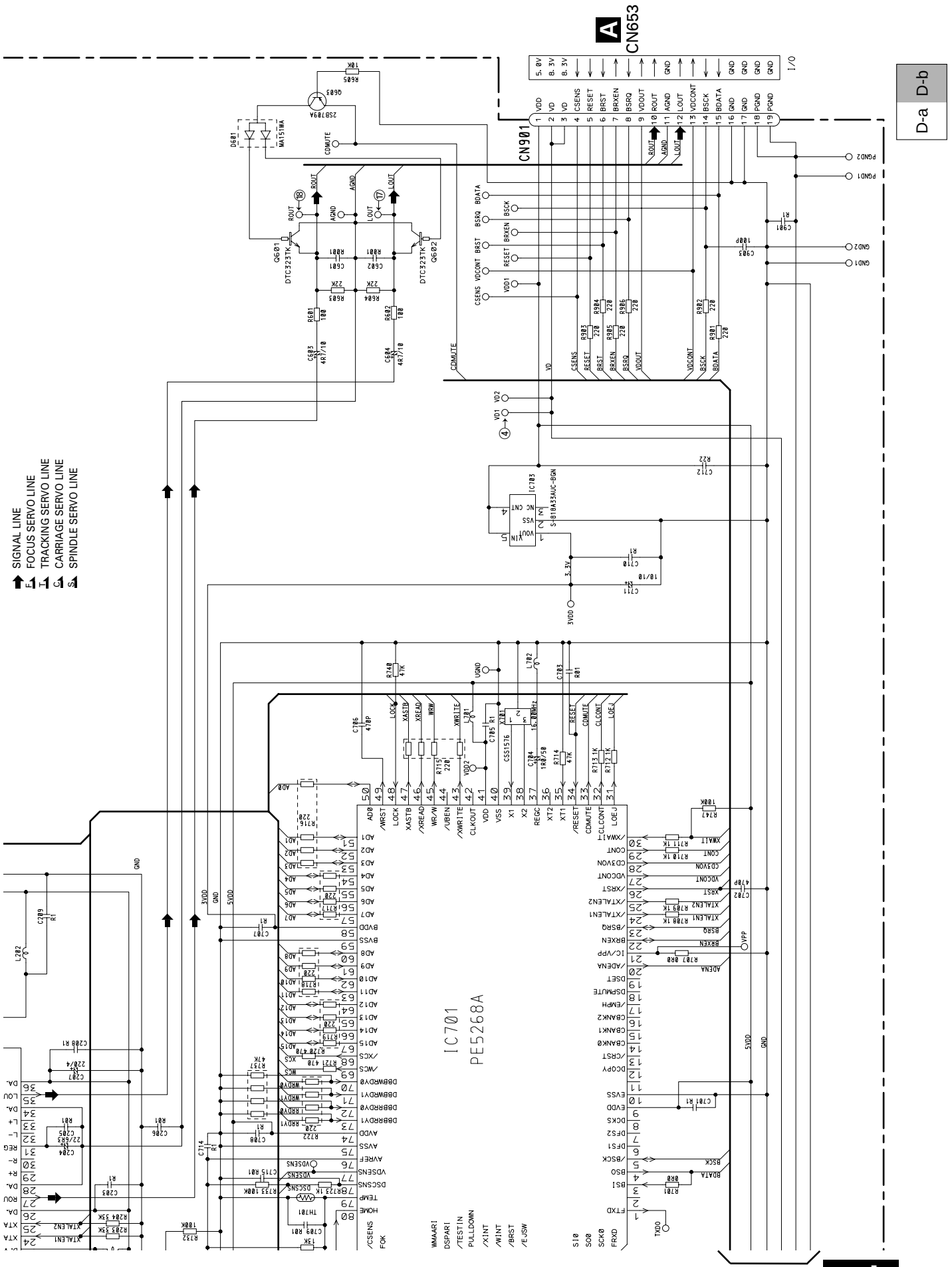

SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
IC701
PE5268A
DECODER
OCESSOR
IC202
MSM51V4265EP-70TS
CN901
CN653
S-818A33AUC-BGN
DTC323TK
WA151WA


D CD CORE UNIT(S9MP3)
PICKUP UNIT(SERVICE)
(P9MP3)
IC201
UPD63760GJ
RF AMP, CD DECODER, MP3 DE
DIGITAL SERVO/DATA PROCE
D-RAM
CN101
HOLOGRAM UNIT
TRK ACT FOCUS ACT
E:P5+P10
F:P1+P6
F. ACT : Applying positive voltage to FOP.
the lens moves Disc side.
T. ACT : Applying positive voltage to TOP.
the lens moves outer circumference.
D-a
D-b


SWITCHES:
CD CORE UNIT(S9MP3)
S901 : HOME SWITCH ····· ON-OFF
S902 : CLAMP SWITCH ···· ON-OFF
S903 : DSCSNS SWITCH ···· ON-OFF
S904 : 12EJ SWITCH ····· ON-OFF
S905 : 8EJ SWITCH ····· ON-OFF
The underlined indicates the switch position.
Ⓑ Monitor land
Land for manual soldering
MOTOR DRIVER LOGIC TABLE
LOAD EJ PLAY OFF
CLCONT H L L
LOEJ H H – –
CONT L L H L
NOTE1) GND ···CD LSI, RFAMP, CPU
PGND ···Actuator, Motor Driver
AGND ···Audio
These GND's are not connected to each other on PCB.
PGND is connected to a floating mechanism part by a screw.
SPINDLE MOTOR
M1 CXB6007
LOADING/CARRIAGE MOTOR
M2 CXB5903
D-a D-b

D-a D-b


SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
MP3 DECODER PROCESSOR
IC202
MSM51V4265EP-70TS
DRAM

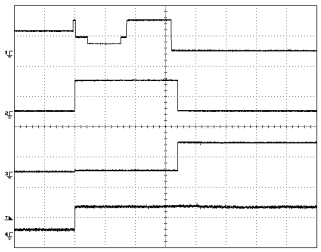

SIGNAL LINE
FOCUS SERVO LINE
TRACKING SERVO LINE
CARRIAGE SERVO LINE
SPINDLE SERVO LINE
CN653
CN901
D-a D-b
IC701
PE5268A
IC703
S-1818A33AUC-BGN
Q601
DTC323TK
Q602
DTC323TK
D601
MA151WA
Q603
2SB709A
VDD
VD
CSENS
RESET
BRST
BRXEN
BSRQ
VDOUT
ROUT
AGND
LOUT
VDCONT
BSCK
BDATA
GND
PGND
PGND2
PGND1
GND2
GND1
COMMUTE
VD2
VD1
3.3V
3VDD
5VDD
UGND
XWRITE
XREAD
XASTB
LOCK
/WRST
/RESET
CLCONT
LOEJ
/XWAIT
CONT
CD3VON
VDCONT
/XRST
/XTALEN2
/XTALEN1
BSRQ
BRXEN
/ADENA
DSET
/EMPH
CBANK2
CBANK1
CBANK0
/CRST
DCOPY
EVSS
EVDD
DCKS
DFS2
DFS1
/BSCK
BSO
BSI
FTXD
FRXD
SCK0
SO0
S10
/CSENS
FOK
/TESTIN
PULLDOWN
/XINT
/WINT
/BRST
/EJSW
WMAAR1
DSPAR1
TEMP
HOME
DSCSNS
VDSENS
/MCS
/XCS
AVDD
AVSS
AVREF
BVDD
BVSS
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
AD8
AD9
AD10
AD11
AD12
AD13
AD14
AD15
DBBWRDY0
DBBWRDY1
DBBRRDY0
DBBRRDY1
16.900MHz
CSS1576
TH701
TXDO

Note:1. The encircled numbers denote measuring points in the circuit diagram.
2. Reference voltage
REFO1 : 1.65V

## ● Waveforms

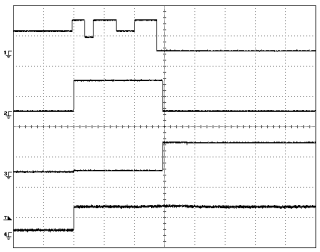
① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div.
③ CH3:LOEJ 5V/div.
④ CH4:VD 10V/div.
500ms/div.
When loading a 12cm CD

Ref. : GND
Mode : Normal



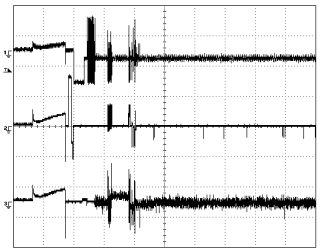
① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div.
③ CH3:LOEJ 5V/div.
④ CH4:VD 10V/div.
500ms/div.
When loading an 8cm CD

Ref. : GND
Mode : Normal



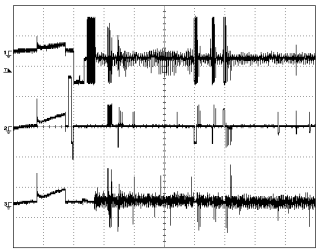
⑤ CH1:SIN 1V/div.
⑥ CH2:CIN 500mV/div.
⑦ CH3:TIN 500mV/div.
2s/div.
When setting up after loading a 12cm CD-DA disc

Ref. : REFO
Mode : Normal



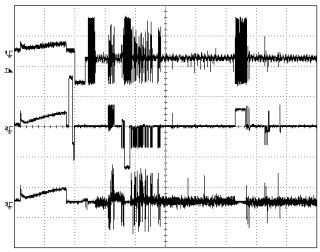
⑤ CH1:SIN 1V/div.
⑥ CH2:CIN 500mV/div.
⑦ CH3:TIN 500mV/div.
2s/div.
When setting up after loading a 12cm CD-ROM(1 session)

Ref. : REFO
Mode : Normal



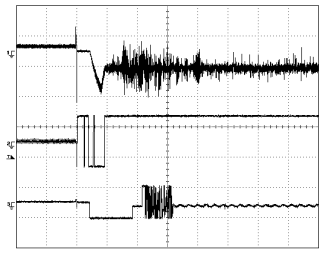
⑤ CH1:SIN 1V/div.
⑥ CH2:CIN 500mV/div.
⑦ CH3:TIN 500mV/div.
2s/div.
When setting up after loading a 12cm CD-ROM(2 session)

Ref. : REFO
Mode : Normal



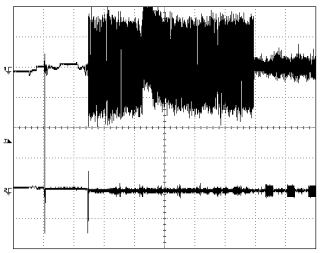
⑧ CH1:FIN 200mV/div.
⑨ CH2:RFOK 2V/div.
⑤ CH3:SIN 2V/div.
500ms/div.
When setting up "Source On" (12cm CD-DA)

Ref. : REFO
Mode : Normal



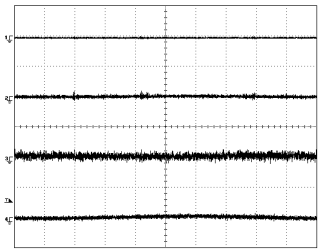
⑩ CH1:TE 500mV/div.
⑪ CH2:FE 500mV/div.
200ms/div.
When setting up "Source On"

Ref. : REFO
Mode : Normal



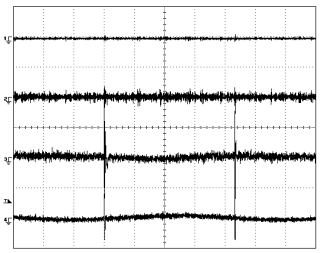
⑪ CH1:FE 500mV/div.
⑧ CH2:FIN 500mV/div.
⑩ CH3:TE 500mV/div.
⑦ CH4:TIN 500mV/div.
20ms/div.
During "Play" (CD-DA)

Ref. : REFO
Mode : Normal



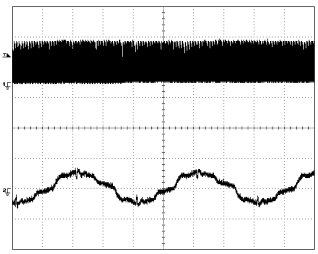
⑪ CH1:FE 500mV/div.
⑧ CH2:FIN 500mV/div.
⑩ CH3:TE 500mV/div.
⑦ CH4:TIN 500mV/div.
20ms/div.
During "Play"(CD-ROM, generating 1Track Jump periodically) Refer to "1Track Jump."

Ref. : REFO
Mode : Normal



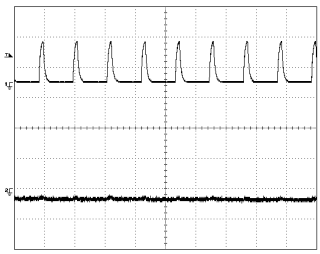
⑫ CH1:MDX 500mV/div.
⑤ CH2:SIN 1V/div.
5ms/div.
Spindle waveform during "Play"

Ref. : REFO
Mode : Normal



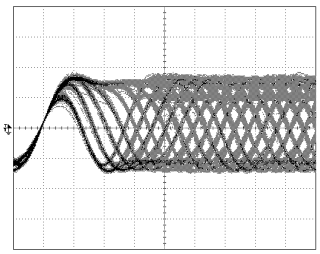
⑫ CH1:MDX 500mV/div.
⑤ CH2:SIN 1V/div.
5µs/div.
Spindle waveform during "Play" (Magnified)

Ref. : REFO
Mode : Normal



⑬ CH1:RFAGC 500mV/div.
5µs/div.
RF eye pattern

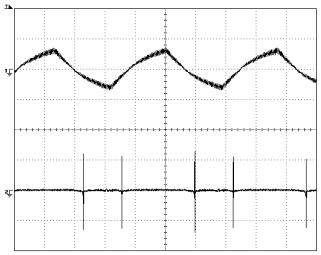
Ref. : REFO
Mode : Normal



⑧ CH1:FIN 500mV/div.
⑪ CH2:FE 500mV/div. 200ms/div.

Focus Search

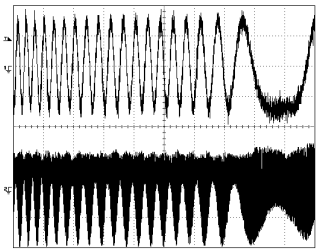
Ref. : REFO
Mode : TEST



⑩ CH1:TE 500mV/div.
⑬ CH2:RFAGC 500mV/div. 2ms/div.

When "Tracking Open"

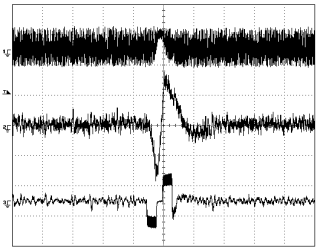
Ref. : REFO
Mode : TEST



⑬ CH1:RFAGC 1V/div.
⑩ CH2:TE 500mV/div. 500µs/div.
⑦ CH3:TIN 500mV/div.

1Track Jump

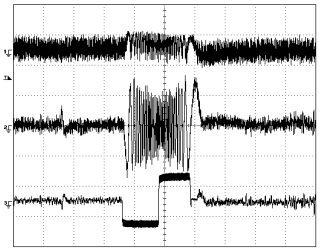
Ref. : REFO
Mode : TEST



⑬ CH1:RFAGC 1V/div.
⑩ CH2:TE 500mV/div. 1ms/div.
⑦ CH3:TIN 500mV/div.

32Track Jump

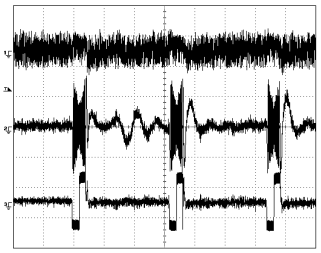
Ref. : REFO
Mode : TEST



⑬ CH1:RFAGC 1V/div.
⑩ CH2:TE 500mV/div. 5ms/div.
⑦ CH3:TIN 500mV/div.

100Track Jump

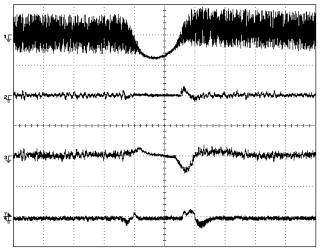
Ref. : REFO
Mode : TEST



⑬ CH1:RFAGC 1V/div.
⑦ CH2:TIN 1V/div.
⑩ CH3:TE 1V/div. 500µs/div.
⑧ CH4:FIN 1V/div.

When reproducing black dots(800µm)

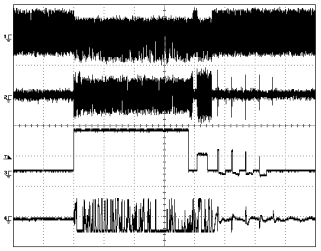
Ref. : REFO
Mode : Normal



⑬ CH1:RFAGC 1V/div.
⑩ CH2:TE 1V/div.
⑥ CH3:CIN 500mV/div. 500µs/div.
⑤ CH4:SIN 2V/div.

During inside/outside search (outer circumference → inner circumference)

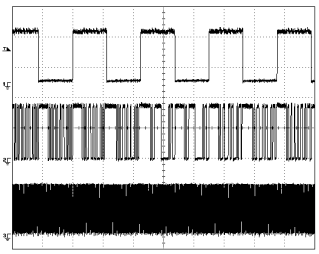
Ref. : REFO
Mode : Normal



⑭ CH1:LRCKIN 2V/div.
⑮ CH2:DIN 2V/div. 10µs/div.
⑯ CH3:SCKIN 2V/div.

Digital Audio

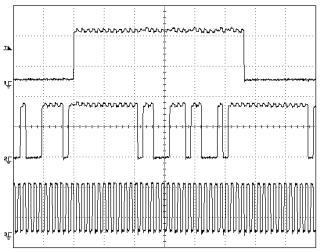
Ref. : GND
Mode : Normal



⑭ CH1:LRCKIN 2V/div.
⑮ CH2:DIN 2V/div. 2µs/div.
⑯ CH3:SCKIN 2V/div.

Digital Audio (Magnified)

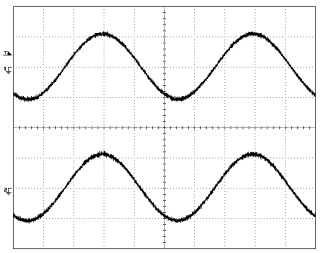
Ref. : REFO
Mode : Normal



⑰ CH1:LOUT 1V/div.
⑱ CH2:ROUT 1V/div. 200µs/div.

Analog Audio (Magnified)

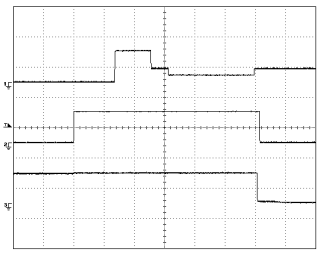
Ref. : AGND
Mode : Normal



① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div. 10µs/div.
③ CH3:LOEJ 5V/div.

When "Eject" (12cm CD)

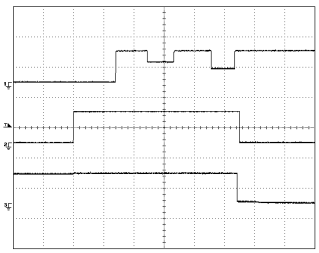
Ref. : GND
Mode : Normal



① CH1:DSCSNS 5V/div.
② CH2:CLCONT 5V/div. 10µs/div.
③ CH3:LOEJ 5V/div.

When "Eject" (8cm CD)

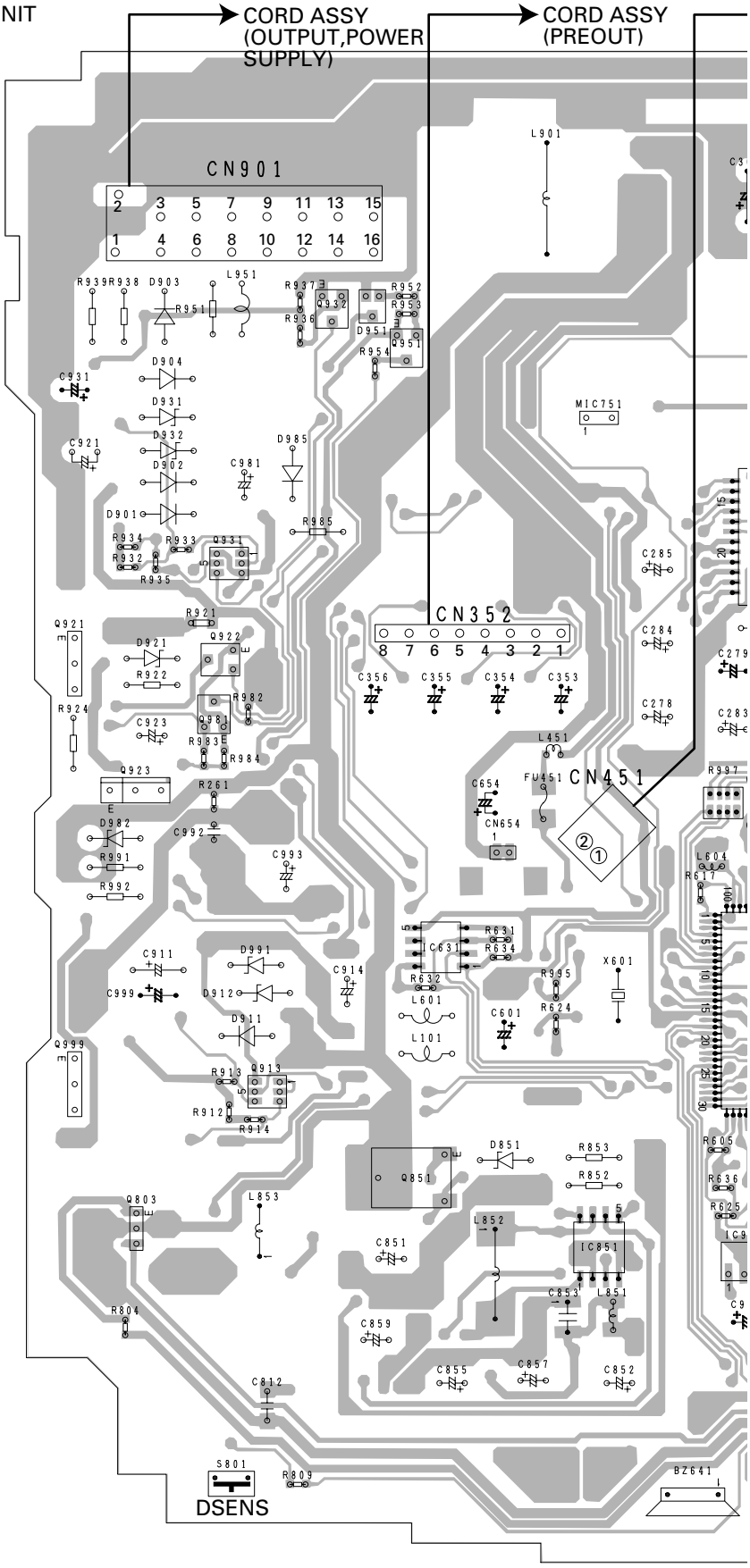
Ref. : GND
Mode : Normal



# 4. PCB CONNECTION DIAGRAM

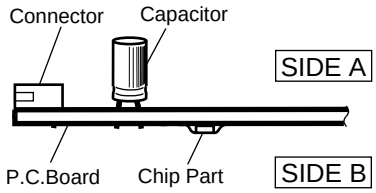
## 4.1 TUNER AMP UNIT

**A** TUNER AMP UNIT

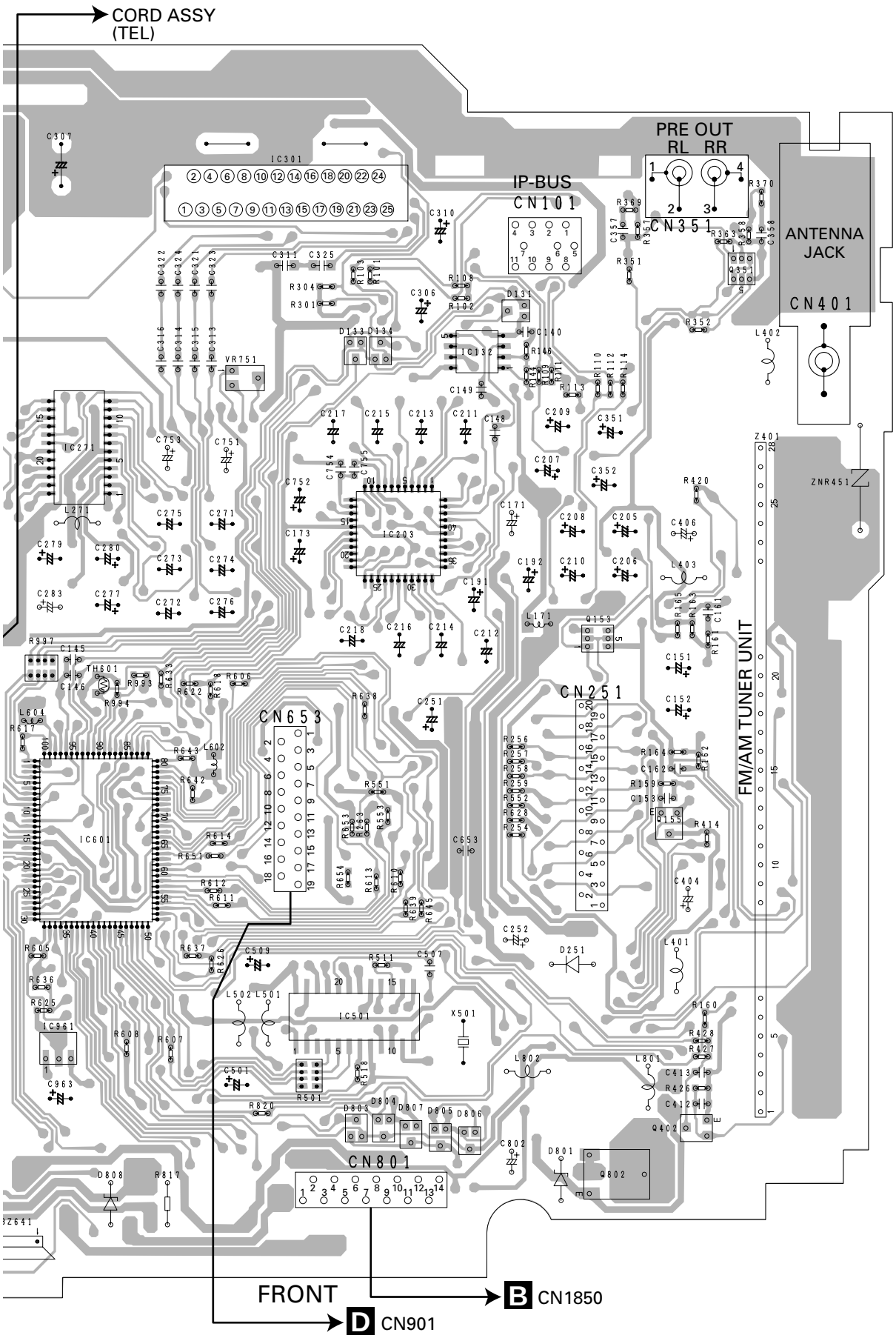



### NOTE FOR PCB DIAGRAMS

1. The parts mounted on this PCB include all necessary parts for several destination.
   For further information for respective destinations, be sure to check with the schematic diagram.
2. Viewpoint of PCB diagrams



SIDE A




IC,Q

IC301

Q932
Q351
Q951

IC132

IC271 Q931

Q921
Q922 IC203

Q981
Q153
Q923

IC631
Q155
IC601
Q999
Q913

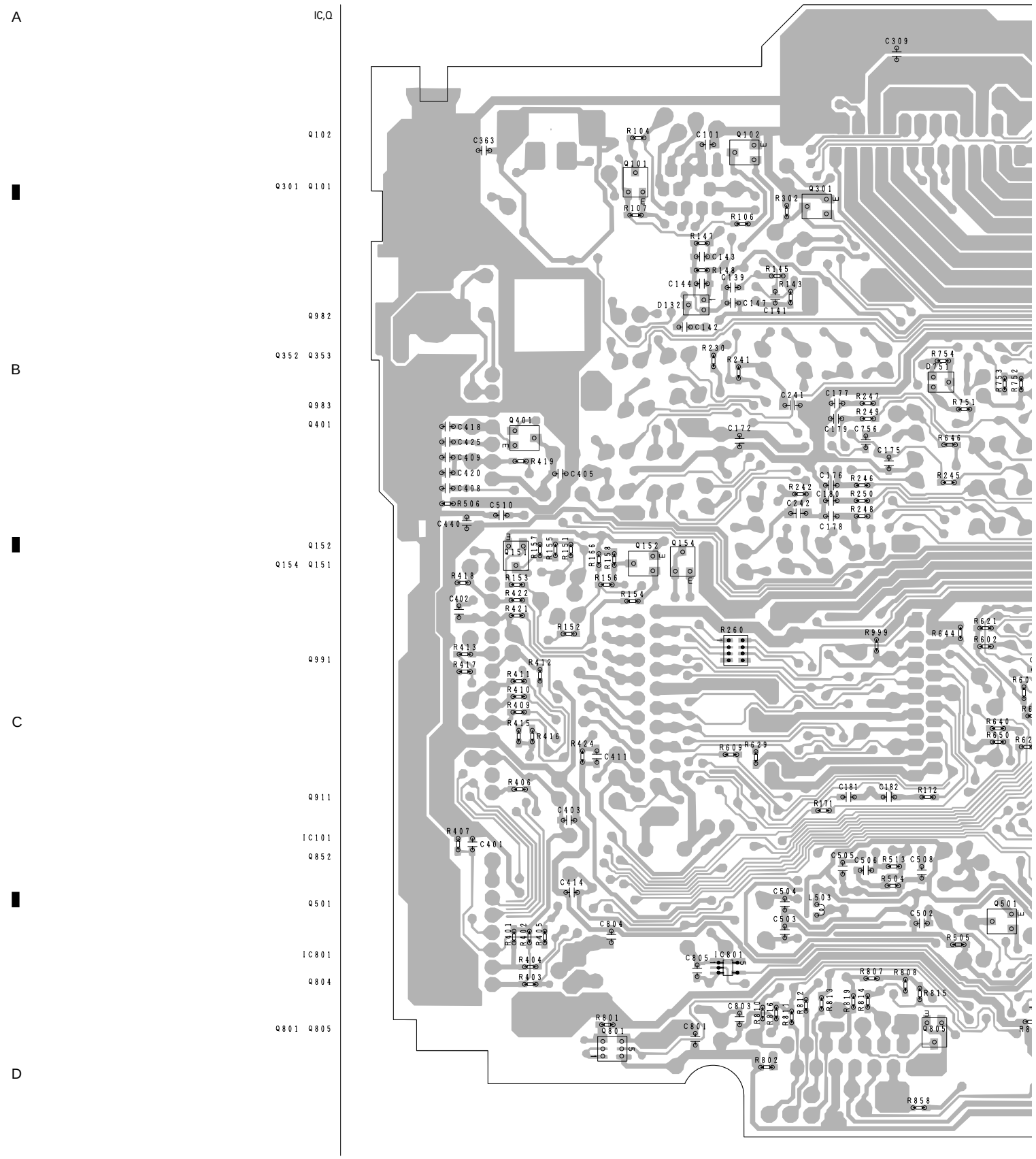
Q851
Q803
IC501 IC961
IC851

Q402

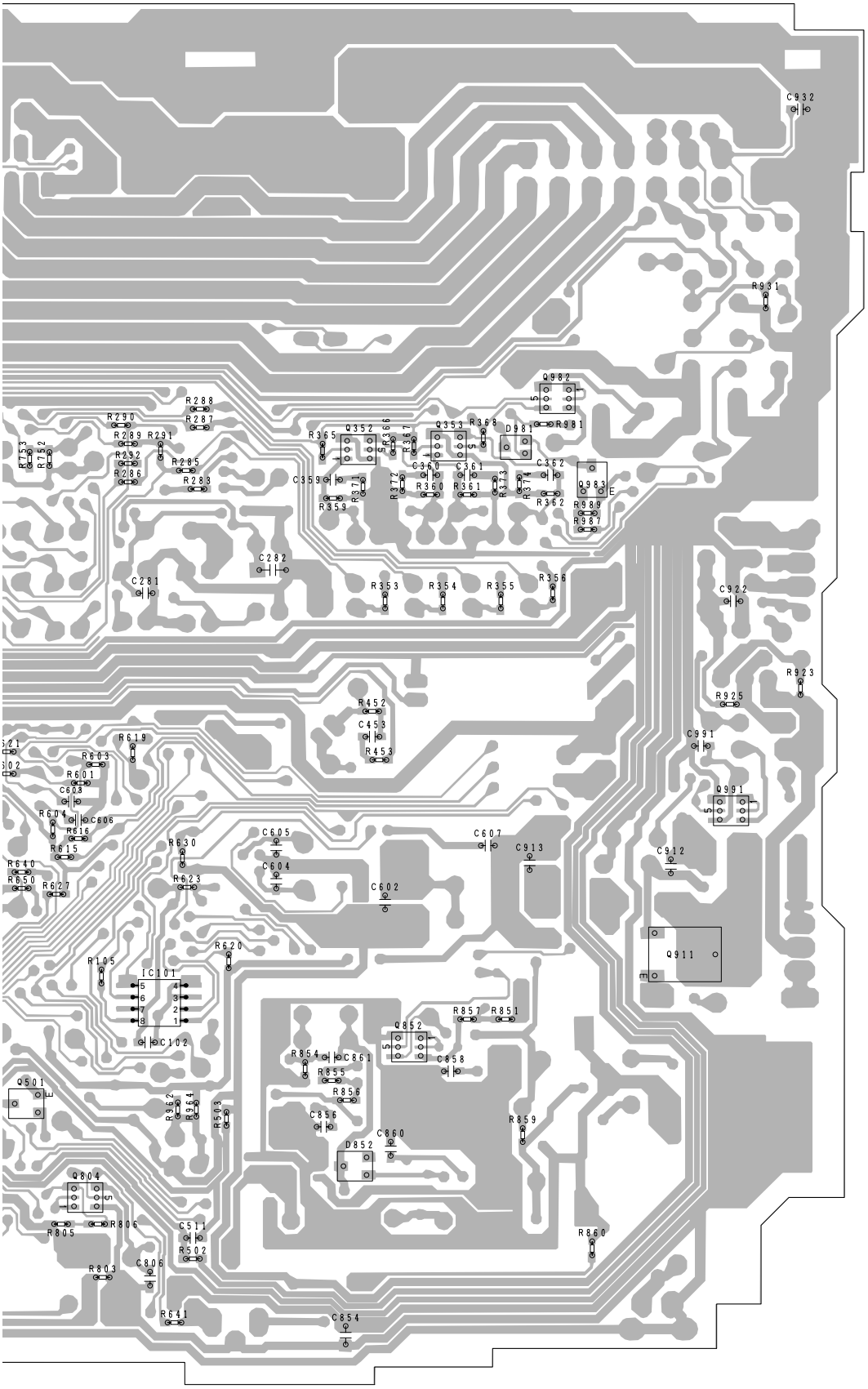
Q802

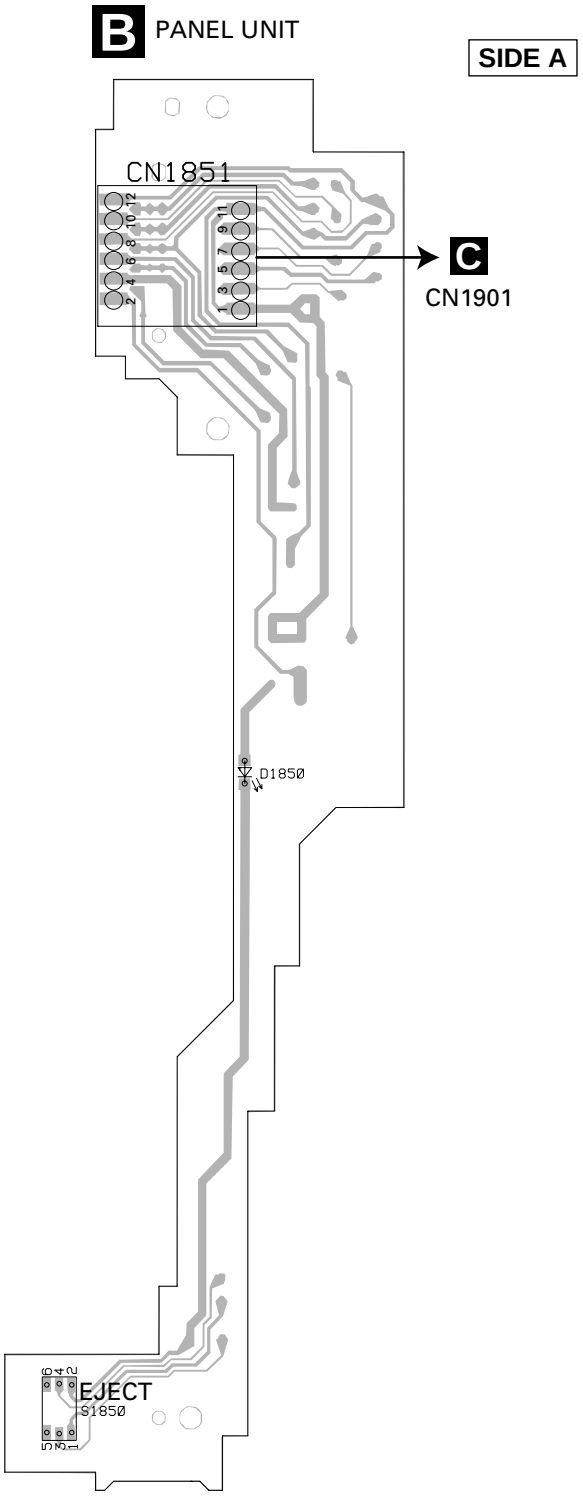
A 29

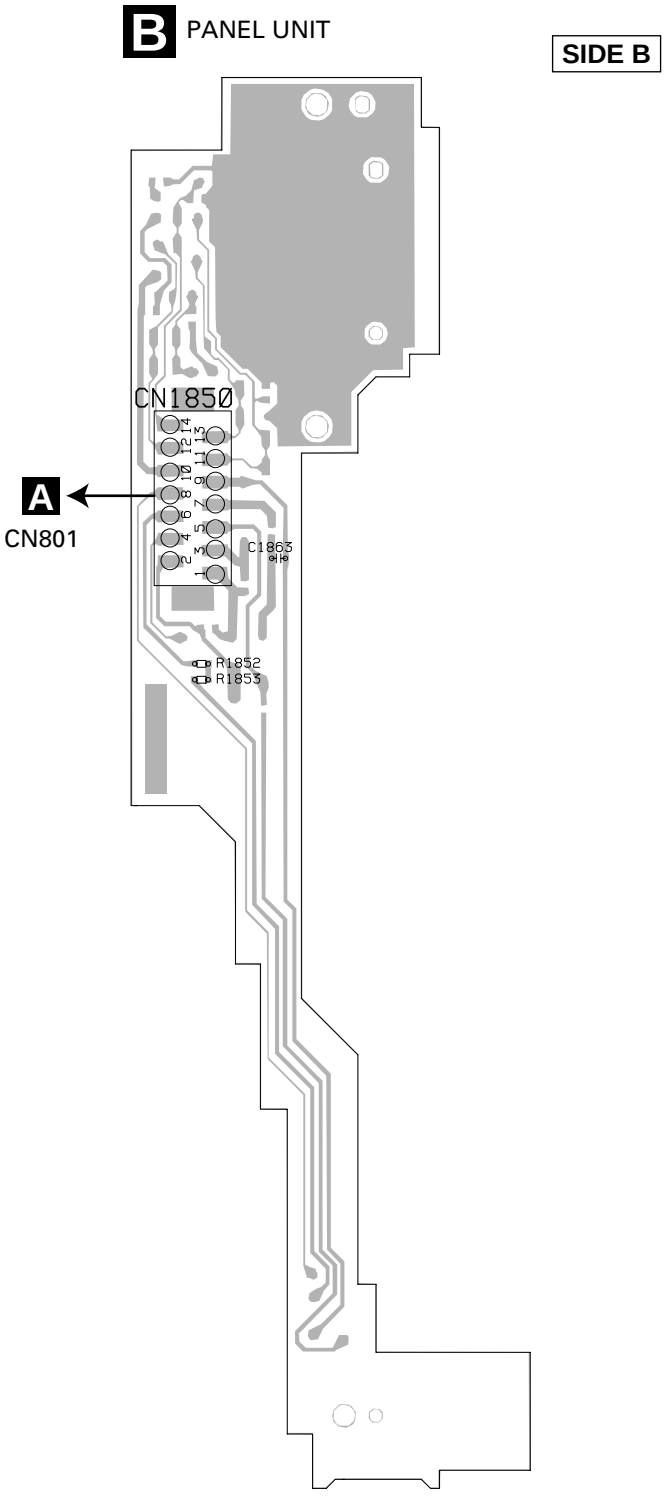
## A TUNER AMP UNIT



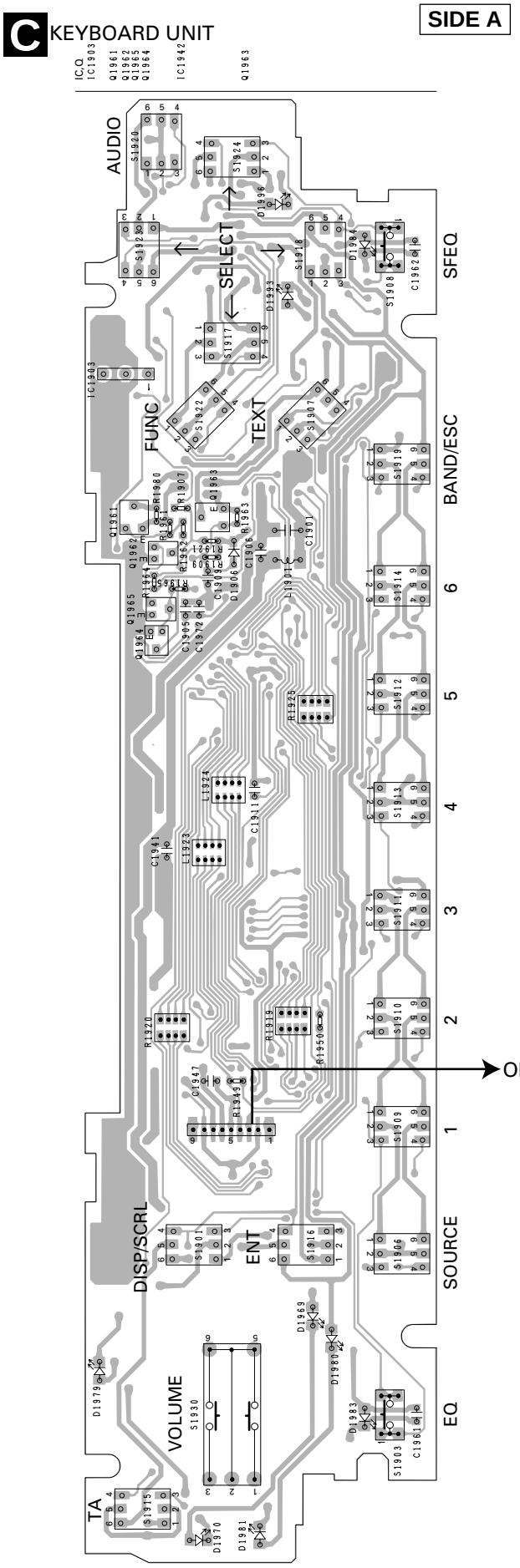
SIDE B

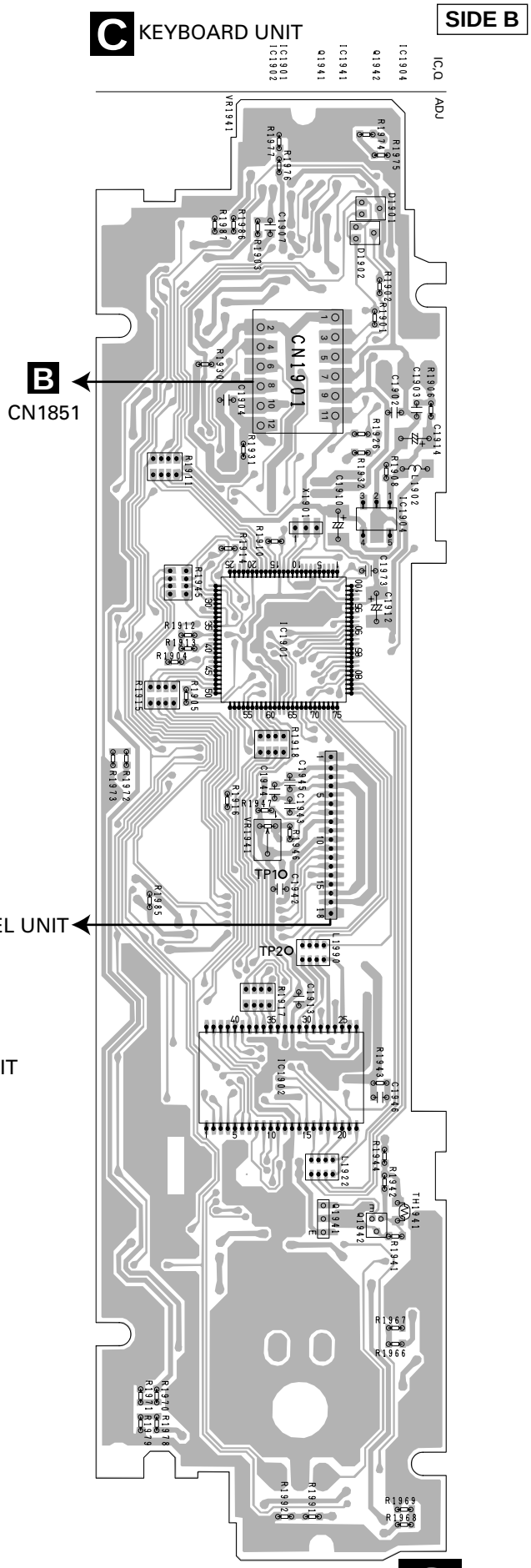

C932
R931
Q982
R981
D981
R288
R287
R290
R289
R291
R292
R286
R285
R283
R753
R752
Q352
Q353
R365
R366
R367
R368
C359
C360
C361
C362
R359
R360
R361
R362
R371
R372
R373
R374
Q983
R989
R987
C282
C281
R353
R354
R355
R356
C922
R923
R925
R452
C453
R453
R619
R603
R601
C603
R604
C606
R616
R615
R640
R650
R627
R630
R623
C605
C604
C602
C607
C913
C912
C991
Q991
Q911
R620
R105
IC101
C102
Q852
R857
R851
R854
C861
C858
R855
R856
C856
R859
C860
D852
Q501
R962
R964
R503
Q804
R805
R806
C511
R502
R803
C806
R641
C854
R860


B PANEL UNIT
SIDE A
CN1851
C
CN1901
D1850
EJECT
S1850

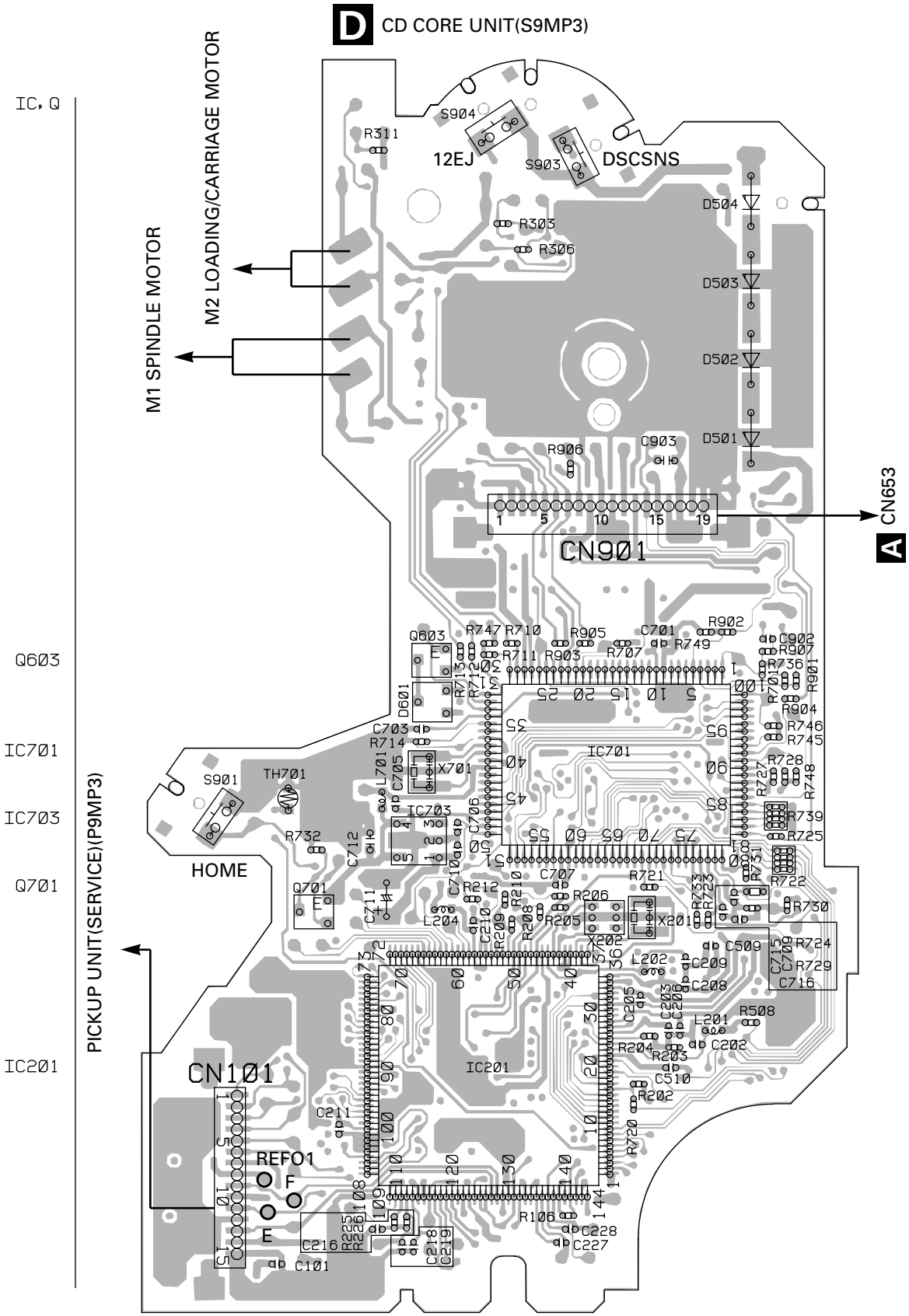

B PANEL UNIT
SIDE B
CN1850
A
CN801
C1863
R1852
R1853

## 4.3 KEYBOARD UNIT



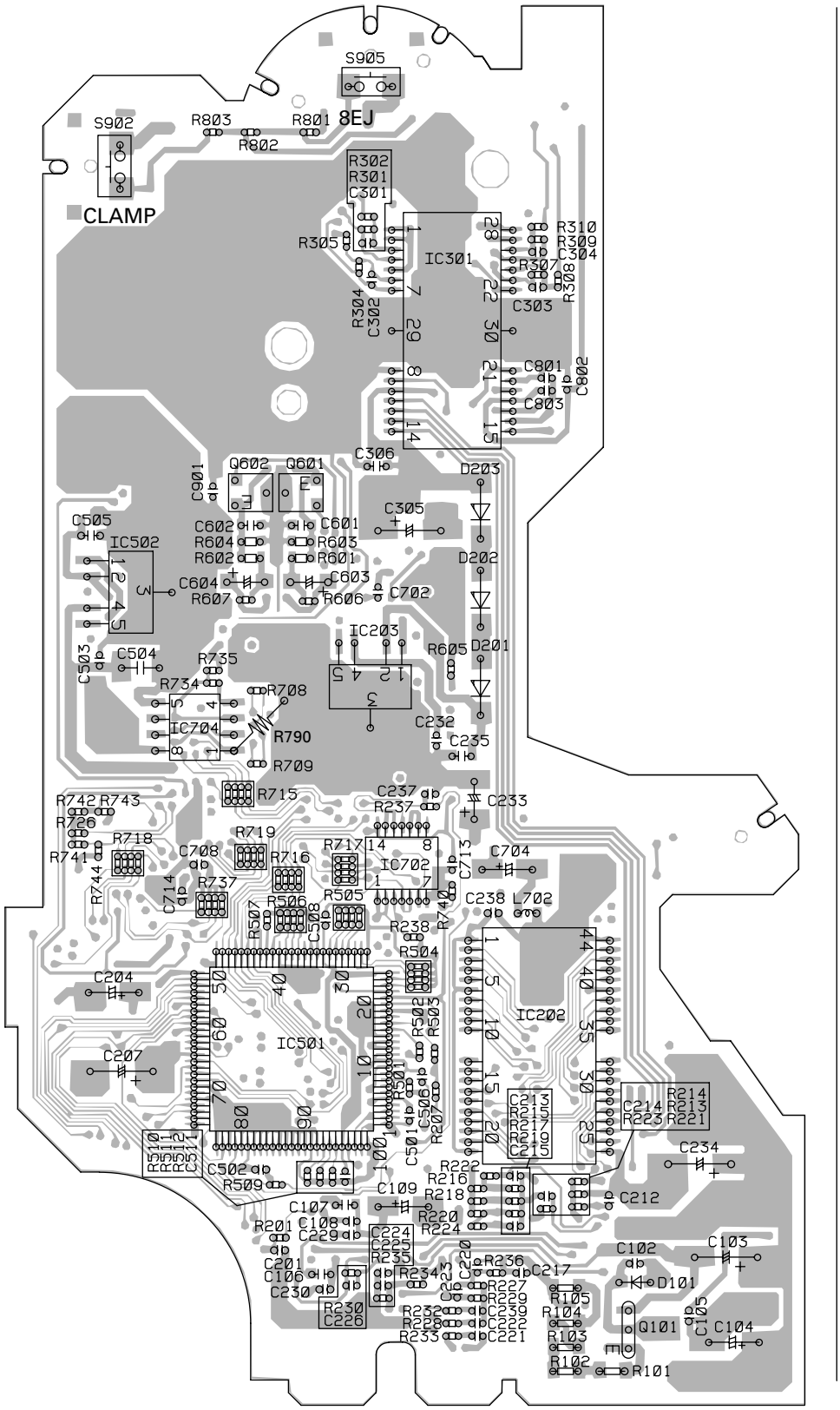



## 4.3 CD MECHANISM MODULE



## D CD CORE UNIT(S9MP3)

SIDE B



# 5. ELECTRICAL PARTS LIST

**NOTES:**

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/○S○○○J,RS1/○○S○○○J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

**A** Unit Number : CWM7982
Unit Name : Tuner Amp Unit

MISCELLANEOUS

| =====Circuit Symbol and No. | | ===Part Name | Part No. |
|---|---|---|---|
| IC | 101 | IC | HA12187FP |
| IC | 132 | IC | NJM4558MD |
| IC | 203 | IC | PML009A |
| IC | 301 | IC | PAL007A |
| IC | 501 | IC | PM4009A |
| IC | 601 | IC | PD5702A |
| IC | 631 | IC | PDH0044A |
| IC | 801 | IC | TC7SET08FU |
| IC | 851 | IC | NJM2360M |
| IC | 961 | IC | S-80735ANDZI |
| Q | 101 | Transistor | 2SA1037K |
| Q | 102 | Transistor | DTC124EK |
| Q | 151 | Transistor | 2SD1757K |
| Q | 152 | Transistor | 2SD1757K |
| Q | 153 | Transistor | IMH3A |
| Q | 155 | Transistor | 2SC2412K |
| Q | 301 | Transistor | DTC124EK |
| Q | 351 | Transistor | IMH3A |
| Q | 352 | Transistor | IMH3A |
| Q | 353 | Transistor | IMH3A |
| Q | 401 | Transistor | 2SC2412K |
| Q | 402 | Transistor | 2SC2412K |
| Q | 501 | Transistor | DTA124EK |
| Q | 801 | Transistor | IMD2A |
| Q | 802 | Transistor | 2SD1760F5 |
| Q | 803 | Transistor | 2SD1767 |
| Q | 804 | Transistor | IMD2A |
| Q | 805 | Transistor | DTC143EK |
| Q | 851 | Transistor | 2SD1760F5 |
| Q | 852 | Transistor | IMD2A |
| Q | 911 | Transistor | 2SD1760F5 |
| Q | 913 | Transistor | IMD2A |
| Q | 921 | Transistor | 2SD2396 |
| Q | 922 | Transistor | DTC114EK |
| Q | 923 | Transistor | 2SB1238 |
| Q | 931 | Transistor | IMX1 |
| Q | 932 | Transistor | 2SC2412K |
| Q | 951 | Transistor | 2SA1037K |
| Q | 981 | Transistor | 2SC2412K |
| Q | 982 | Transistor | IMD2A |
| Q | 991 | Transistor | IMD2A |
| Q | 999 | Transistor | 2SD2396 |
| D | 131 | Diode Network | DA204U |
| D | 132 | Diode Network | DA204U |
| D | 133 | Diode | DAN202U |
| D | 134 | Diode | DAP202U |
| D | 801 | Diode | HZS6L(B1) |
| D | 803 | Diode Network | DA204U |
| D | 804 | Diode | DAN202U |
| D | 805 | Diode | DAP202U |

| =====Circuit Symbol and No. | | ===Part Name | Part No. |
|---|---|---|---|
| D | 806 | Diode | DAN202U |
| D | 807 | Diode | DAP202U |
| D | 808 | Diode | HZS11L(A1) |
| D | 851 | Diode | HZS9L(C3) |
| D | 852 | Diode | RB411D |
| D | 901 | Diode | 1SR139-400 |
| D | 902 | Diode | 1SR139-400 |
| D | 903 | Diode | 1SR139-400 |
| D | 904 | Diode | 1SR139-400 |
| D | 911 | Diode | 1SR139-400 |
| D | 912 | Diode | HZS6L(B1) |
| D | 921 | Diode | HZS9L(C1) |
| D | 931 | Diode | HZS7L(A1) |
| D | 932 | Diode | HZS7L(C3) |
| D | 951 | Diode | DAN202U |
| D | 981 | Diode | DAN202U |
| D | 982 | Diode | HZS9L(A2) |
| D | 991 | Diode | HZS9L(B1) |
| ZNR | 451 | Surge Protector | DSP-201M-A21F |
| L | 171 | Inductor | CTF1530 |
| L | 401 | Ferri-Inductor | LAU2R2K |
| L | 402 | Ferri-Inductor | LAU4R7K |
| L | 403 | Inductor | LAU1R0K |
| L | 451 | Inductor | CTF1378 |
| L | 501 | Ferri-Inductor | LAU101K |
| L | 502 | Ferri-Inductor | LAU2R2K |
| L | 503 | Inductor | CTF1378 |
| L | 601 | Ferri-Inductor | LAU2R2K |
| L | 602 | Inductor | LCTA2R2J2520 |
| L | 801 | Inductor | LAU100K |
| L | 802 | Ferri-Inductor | LAU2R2K |
| L | 852 | Inductor | CTF1510 |
| L | 853 | Inductor | CTF1489 |
| L | 901 | Choke Coil 600µH | CTH1221 |
| L | 951 | Ferri-Inductor | LAU2R2K |
| X | 501 | Crystal Resonator 3.648MHz | CSS1447 |
| X | 601 | Radiator 10.00MHz | CSS1475 |
| S | 801 | Switch(DSENS) | CSN1039 |
| FU | 451 | Fuse 200mA | CEK1189 |
| | | FM/AM Tuner Unit | CWE1562 |
| BZ | 641 | Buzzer | CPV1050 |

RESISTORS

| | | | |
|---|---|---|---|
| R | 101 | | RS1/16S101J |
| R | 102 | | RS1/16S470J |
| R | 103 | | RS1/16S101J |
| R | 104 | | RS1/16S222J |
| R | 105 | | RS1/16S103J |
| R | 106 | | RS1/16S562J |
| R | 107 | | RS1/16S332J |
| R | 108 | | RS1/16S150J |
| R | 109 | | RS1/16S181J |
| R | 110 | | RS1/16S181J |

| =====Circuit Symbol and No. | | ===Part Name | Part No. |
|---|---|---|---|
| R | 111 | | RS1/16S223J |
| R | 112 | | RS1/16S223J |
| R | 113 | | RS1/16S102J |
| R | 114 | | RS1/16S102J |
| R | 143 | | RS1/16S104J |
| R | 144 | | RS1/16S104J |
| R | 145 | | RS1/16S563J |
| R | 146 | | RS1/16S563J |
| R | 147 | | RS1/16S474J |
| R | 148 | | RS1/16S474J |
| R | 153 | | RS1/16S224J |
| R | 154 | | RS1/16S224J |
| R | 155 | | RS1/16S222J |
| R | 156 | | RS1/16S222J |
| R | 157 | | RS1/16S223J |
| R | 158 | | RS1/16S223J |
| R | 159 | | RS1/16S224J |
| R | 160 | | RS1/16S473J |
| R | 161 | | RS1/16S162J |
| R | 162 | | RS1/16S162J |
| R | 163 | | RS1/16S272J |
| R | 164 | | RS1/16S272J |
| R | 165 | | RS1/16S104J |
| R | 166 | | RS1/16S104J |
| R | 171 | | RS1/16S102J |
| R | 172 | | RS1/16S102J |
| R | 230 | | RS1/16S0R0J |
| R | 241 | | RS1/16S102J |
| R | 242 | | RS1/16S102J |
| R | 245 | | RS1/16S101J |
| R | 246 | | RS1/16S101J |
| R | 247 | | RS1/16S101J |
| R | 248 | | RS1/16S101J |
| R | 249 | | RS1/16S101J |
| R | 250 | | RS1/16S101J |
| R | 285 | | RS1/16S0R0J |
| R | 286 | | RS1/16S0R0J |
| R | 287 | | RS1/16S0R0J |
| R | 288 | | RS1/16S0R0J |
| R | 289 | | RS1/16S0R0J |
| R | 290 | | RS1/16S0R0J |
| R | 301 | | RS1/16S103J |
| R | 302 | | RS1/16S103J |
| R | 304 | | RS1/16S331J |
| R | 351 | | RS1/16S821J |
| R | 352 | | RS1/16S821J |
| R | 353 | | RS1/16S821J |
| R | 354 | | RS1/16S821J |
| R | 355 | | RS1/16S821J |
| R | 356 | | RS1/16S821J |
| R | 357 | | RS1/16S223J |
| R | 358 | | RS1/16S223J |
| R | 359 | | RS1/16S223J |
| R | 360 | | RS1/16S223J |
| R | 361 | | RS1/16S223J |
| R | 362 | | RS1/16S223J |
| R | 363 | | RS1/16S0R0J |
| R | 366 | | RS1/16S0R0J |
| R | 368 | | RS1/16S0R0J |
| R | 401 | | RS1/16S473J |
| R | 402 | | RS1/16S473J |
| R | 403 | | RS1/16S681J |
| R | 404 | | RS1/16S681J |
| R | 405 | | RS1/16S681J |
| R | 406 | | RS1/16S102J |

| =====Circuit Symbol and No. | | ===Part Name | Part No. |
|---|---|---|---|
| R | 407 | | RS1/16S473J |
| R | 409 | | RS1/16S681J |
| R | 410 | | RS1/16S103J |
| R | 411 | | RS1/16S681J |
| R | 412 | | RS1/16S681J |
| R | 413 | | RS1/16S681J |
| R | 414 | | RS1/16S473J |
| R | 415 | | RS1/16S472J |
| R | 416 | | RS1/16S473J |
| R | 417 | | RS1/16S473J |
| R | 418 | | RS1/16S473J |
| R | 419 | | RS1/16S222J |
| R | 420 | | RS1/16S222J |
| R | 421 | | RS1/16S681J |
| R | 422 | | RS1/16S681J |
| R | 424 | | RS1/16S393J |
| R | 426 | | RS1/16S153J |
| R | 427 | | RS1/16S474J |
| R | 428 | | RS1/16S681J |
| R | 452 | | RS1/16S102J |
| R | 453 | | RS1/16S0R0J |
| R | 501 | | RAB4C102J |
| R | 503 | | RS1/16S0R0J |
| R | 506 | | RS1/16S0R0J |
| R | 511 | | RS1/16S102J |
| R | 513 | | RS1/16S225J |
| R | 518 | | RS1/16S681J |
| R | 605 | | RS1/16S0R0J |
| R | 607 | | RS1/16S0R0J |
| R | 608 | | RS1/16S104J |
| R | 610 | | RS1/16S102J |
| R | 611 | | RS1/16S102J |
| R | 612 | | RS1/16S102J |
| R | 614 | | RS1/16S222J |
| R | 615 | | RS1/16S104J |
| R | 616 | | RS1/16S473J |
| R | 617 | | RS1/16S0R0J |
| R | 619 | | RS1/16S473J |
| R | 620 | | RS1/16S472J |
| R | 621 | | RS1/16S473J |
| R | 623 | | RS1/16S473J |
| R | 624 | | RS1/16S0R0J |
| R | 625 | | RS1/16S682J |
| R | 626 | | RS1/16S682J |
| R | 627 | | RS1/16S104J |
| R | 628 | | RS1/16S104J |
| R | 629 | | RS1/16S104J |
| R | 630 | | RS1/16S104J |
| R | 631 | | RS1/16S102J |
| R | 632 | | RS1/16S104J |
| R | 634 | | RS1/16S473J |
| R | 636 | | RS1/16S221J |
| R | 637 | | RS1/16S221J |
| R | 639 | | RS1/16S0R0J |
| R | 641 | | RS1/16S102J |
| R | 644 | | RS1/16S0R0J |
| R | 645 | | RS1/16S0R0J |
| R | 654 | | RS1/16S104J |
| R | 801 | | RS1/16S332J |
| R | 804 | | RS1/16S1R0J |
| R | 805 | | RS1/16S221J |
| R | 806 | | RS1/16S221J |
| R | 807 | | RS1/16S473J |
| R | 808 | | RS1/16S473J |
| R | 809 | | RS1/16S102J |

| Circuit Symbol and No. | | Part Name | Part No. |
|---|---|---|---|
| R | 810 | | RS1/16S222J |
| R | 811 | | RS1/16S222J |
| R | 812 | | RS1/16S222J |
| R | 813 | | RS1/16S222J |
| R | 814 | | RS1/16S222J |
| R | 815 | | RS1/16S473J |
| R | 816 | | RS1/16S104J |
| R | 817 | | RD1/4PU391J |
| R | 819 | | RS1/16S222J |
| R | 820 | | RS1/16S222J |
| R | 851 | | RS1/16S331J |
| R | 852 | | RD1/4PU302J |
| R | 853 | | RD1/4PU302J |
| R | 854 | | RS1/16S121J |
| R | 855 | | RS1/16S391J |
| R | 856 | | RS1/16S1R0J |
| R | 857 | | RS1/16S331J |
| R | 912 | | RS1/16S102J |
| R | 913 | | RS1/16S223J |
| R | 914 | | RS1/16S102J |
| R | 921 | | RS1/10S1R0J |
| R | 922 | | RD1/4PU221J |
| R | 923 | | RS1/16S103J |
| R | 924 | | RD1/4PU222J |
| R | 925 | | RS1/16S122J |
| R | 931 | | RS1/16S472J |
| R | 932 | | RS1/16S473J |
| R | 933 | | RS1/16S103J |
| R | 934 | | RS1/16S473J |
| R | 935 | | RS1/16S104J |
| R | 936 | | RS1/16S103J |
| R | 937 | | RS1/16S473J |
| R | 938 | | RD1/4PU102J |
| R | 939 | | RD1/4PU102J |
| R | 951 | | RD1/4PU153J |
| R | 952 | | RS1/16S472J |
| R | 953 | | RS1/16S472J |
| R | 954 | | RS1/16S102J |
| R | 962 | | RS1/16S102J |
| R | 964 | | RS1/16S822J |
| R | 982 | | RS1/16S223J |
| R | 983 | | RS1/16S223J |
| R | 984 | | RS1/16S473J |
| R | 985 | | RD1/4PU102J |
| R | 991 | | RD1/4PU221J |
| R | 992 | | RD1/4PU221J |
| R | 997 | | RAB4C102J |
| R | 999 | | RS1/16S0R0J |

CAPACITORS

| Circuit Symbol and No. | | Part Name | Part No. |
|---|---|---|---|
| C | 101 | | CKSRYB104K16 |
| C | 102 | | CKSRYB104K16 |
| C | 139 | | CKSRYB104K16 |
| C | 140 | | CKSRYB104K16 |
| C | 141 | | CKSRYB104K16 |
| C | 142 | | CKSRYB104K16 |
| C | 143 | | CKSRYB474K10 |
| C | 144 | | CKSRYB474K10 |
| C | 145 | | CCSRCH101J50 |
| C | 146 | | CCSRCH101J50 |
| C | 147 | | CKSRYB103K50 |
| C | 151 | | CEJQ1R0M50 |
| C | 152 | | CEJQ1R0M50 |
| C | 153 | | CKSRYB223K25 |
| C | 161 | | CKSRYB123K25 |
| C | 162 | | CKSRYB123K25 |
| C | 171 | | CEJQ470M10 |
| C | 172 | | CKSRYB104K16 |
| C | 173 | | CEJQ100M16 |
| C | 177 | | CCSRCH100D50 |
| C | 178 | | CCSRCH100D50 |
| C | 179 | | CCSRCH100D50 |
| C | 180 | | CCSRCH100D50 |
| C | 181 | | CKLSRB152K50 |
| C | 182 | | CKLSRB152K50 |
| C | 191 | | CEJQ1R0M50 |
| C | 192 | | CEJQ1R0M50 |
| C | 205 | | CEJQR22M50 |
| C | 206 | | CEJQR22M50 |
| C | 207 | | CEJQ1R0M50 |
| C | 208 | | CEJQ1R0M50 |
| C | 209 | | CEJQ1R0M50 |
| C | 210 | | CEJQ1R0M50 |
| C | 211 | | CEJQNP4R7M16 |
| C | 212 | | CEJQNP4R7M16 |
| C | 213 | | CEJQNP4R7M16 |
| C | 214 | | CEJQNP4R7M16 |
| C | 215 | | CEJQNP4R7M16 |
| C | 216 | | CEJQNP4R7M16 |
| C | 217 | | CEJQNP4R7M16 |
| C | 218 | | CEJQNP4R7M16 |
| C | 241 | | CCSQCH152J50 |
| C | 242 | | CCSQCH152J50 |
| C | 306 | | CEHAR330M10 |
| C | 307 | 4700µF/16V | CCH1367 |
| C | 309 | | CKSRYB104K16 |
| C | 310 | | CEHAR100M16 |
| C | 311 | | CKSQYB225K10 |
| C | 313 | | CKSRYB474K10 |
| C | 314 | | CKSRYB474K10 |
| C | 315 | | CKSRYB474K10 |
| C | 316 | | CKSRYB474K10 |
| C | 321 | | CKSRYB474K10 |
| C | 322 | | CKSRYB474K10 |
| C | 323 | | CKSRYB474K10 |
| C | 324 | | CKSRYB474K10 |
| C | 325 | | CKSQYB225K10 |
| C | 351 | | CEJQ100M16 |
| C | 352 | | CEJQ100M16 |
| C | 353 | | CEJQ100M16 |
| C | 354 | | CEJQ100M16 |
| C | 355 | | CEJQ100M16 |
| C | 356 | | CEJQ100M16 |
| C | 401 | | CKSRYB182K50 |
| C | 403 | | CKSRYB473K25 |
| C | 404 | | CEJQ101M6R3 |
| C | 405 | | CKSRYB103K50 |
| C | 406 | | CEJQ220M10 |
| C | 408 | | CKSRYB223K50 |
| C | 409 | | CKSRYB223K50 |
| C | 411 | | CKSRYB472K50 |
| C | 413 | | CKSRYB472K50 |
| C | 425 | | CKSRYB102K50 |
| C | 440 | | CKSRYB103K50 |
| C | 453 | | CKSRYB224K16 |
| C | 501 | | CEJQ220M6R3 |
| C | 502 | | CKSRYB104K16 |
| C | 503 | | CCSRCH270J50 |
| C | 504 | | CCSRCH270J50 |
| C | 505 | | CKSRYB104K16 |

| Circuit Symbol and No. | | Part Name | Part No. |
|---|---|---|---|
| C | 506 | | CKSRYB471K50 |
| C | 507 | | CKSRYB471K50 |
| C | 508 | | CKSRYB104K16 |
| C | 509 | | CEJQ220M6R3 |
| C | 510 | | CCSRCH101J50 |
| C | 511 | | CKSRYB102K50 |
| C | 601 | | CEJQ4R7M35 |
| C | 602 | | CKSRYB102K50 |
| C | 604 | | CCSRCH180J50 |
| C | 605 | | CCSRCH220J50 |
| C | 606 | | CKSRYB102K50 |
| C | 654 | 470µF/10V | CCH1438 |
| C | 755 | | CKSRYB104K16 |
| C | 801 | | CKSRYB103K50 |
| C | 802 | | CEJQ470M10 |
| C | 803 | | CKSRYB104K16 |
| C | 805 | | CKSRYB103K25 |
| C | 806 | | CKSRYB473K25 |
| C | 812 | | CKSYB105K25 |
| C | 851 | | CEJQ470M16 |
| C | 853 | 4.7µF | CCG1111 |
| C | 855 | | CEJQ100M25 |
| C | 856 | | CCSRCH331J50 |
| C | 857 | | CEJQ330M25 |
| C | 858 | | CKSRYB104K16 |
| C | 859 | | CEJQ101M10 |
| C | 860 | | CKSRYB104K16 |
| C | 861 | | CKSRYB103K50 |
| C | 912 | | CKSRYB472K50 |
| C | 913 | | CKSRYB103K50 |
| C | 914 | | CEJQ470M10 |
| C | 921 | 330µF/10V | CCH1181 |
| C | 922 | | CKSRYB103K50 |
| C | 923 | | CEJQ101M16 |
| C | 931 | | CEJQ100M16 |
| C | 932 | | CKSRYB104K16 |
| C | 963 | | CEJQ2R2M50 |
| C | 991 | | CKSRYB473K25 |
| C | 992 | | CKSRYB102K50 |
| C | 993 | | CEJQ101M10 |
| C | 999 | 470µF/16V | CCH1183 |

## C Unit Number : CWM7988
## Unit Name : Keyboard Unit

### MISCELLANEOUS

| | | | |
|---|---|---|---|
| IC | 1901 | IC | PD5706A |
| IC | 1902 | IC | PD8088A |
| IC | 1903 | IC | TSOP1840SB3V |
| IC | 1904 | IC | S-818A33AUC-BGN |
| Q | 1941 | Transistor | 2SD1664 |
| Q | 1942 | Transistor | 2SC4617 |
| Q | 1961 | Transistor | 2SB710A |
| Q | 1962 | Transistor | DTC114EU |
| Q | 1963 | Transistor | 2SB710A |
| Q | 1964 | Transistor | DTC114EU |
| Q | 1965 | Transistor | DTC114EU |
| D | 1901 | Diode | DAP202U |
| D | 1902 | Diode | DAN202U |
| D | 1906 | Diode | 1SS355 |
| D | 1969 | LED | CL170DCD |
| D | 1970 | LED | CL170DCD |
| D | 1979 | LED | CL170PGCD |
| D | 1980 | LED | CL170PGCD |
| D | 1981 | LED | CL170PGCD |
| D | 1983 | LED | CL170UBX |

| Circuit Symbol and No. | | Part Name | Part No. |
|---|---|---|---|
| D | 1984 | LED | CL170UBX |
| D | 1993 | LED | CL170PGCD |
| D | 1996 | LED | CL170PGCD |
| L | 1901 | Inductor | CTF1530 |
| L | 1902 | Inductor | CTF1530 |
| L | 1922 | Inductor-Array | CTF1421 |
| L | 1923 | Inductor-Array | CTF1421 |
| L | 1924 | Inductor-Array | CTF1421 |
| L | 1990 | Inductor-Array | CTF1421 |
| TH | 1941 | Thermistor | CCX1037 |
| X | 1901 | Radiator 10.0MHz | CSS1577 |
| S | 1901 | Push Switch | CSG1115 |
| S | 1903 | Push Switch | CSG1111 |
| S | 1906 | Push Switch | CSG1115 |
| S | 1907 | Push Switch | CSG1115 |
| S | 1908 | Push Switch | CSG1111 |
| S | 1909 | Push Switch | CSG1115 |
| S | 1910 | Push Switch | CSG1115 |
| S | 1911 | Push Switch | CSG1115 |
| S | 1912 | Push Switch | CSG1115 |
| S | 1913 | Push Switch | CSG1115 |
| S | 1914 | Push Switch | CSG1115 |
| S | 1915 | Push Switch | CSG1115 |
| S | 1916 | Push Switch | CSG1115 |
| S | 1917 | Push Switch | CSG1115 |
| S | 1918 | Push Switch | CSG1115 |
| S | 1919 | Push Switch | CSG1115 |
| S | 1920 | Push Switch | CSG1115 |
| S | 1922 | Push Switch | CSG1115 |
| S | 1923 | Push Switch | CSG1115 |
| S | 1924 | Push Switch | CSG1115 |
| S | 1930 | Encoder(VOLUME) | CSD1059 |
| VR | 1941 | Semi-fixed 20kΩ(B) | CCP1231 |
| | | OEL Unit | MXS8017 |

### RESISTORS

| | | | |
|---|---|---|---|
| R | 1901 | | RS1/16S222J |
| R | 1902 | | RS1/16S222J |
| R | 1903 | | RS1/16S473J |
| R | 1904 | | RS1/16S103J |
| R | 1905 | | RS1/16S682J |
| R | 1906 | | RS1/16S121J |
| R | 1907 | | RS1/16S2R2J |
| R | 1908 | | RS1/16S222J |
| R | 1909 | | RS1/16S154J |
| R | 1910 | | RS1/16S473J |
| R | 1911 | | RAB4C101J |
| R | 1912 | | RS1/16S473J |
| R | 1913 | | RS1/16S473J |
| R | 1914 | | RS1/16S103J |
| R | 1915 | | RAB4C101J |
| R | 1916 | | RS1/16S101J |
| R | 1917 | | RAB4C101J |
| R | 1918 | | RAB4C101J |
| R | 1919 | | RAB4C101J |
| R | 1920 | | RAB4C101J |
| R | 1925 | | RAB4C101J |
| R | 1926 | | RS1/16S101J |
| R | 1931 | | RS1/16S0R0J |
| R | 1941 | | RS1/16S333J |
| R | 1942 | | RS1/16S683J |
| R | 1943 | | RS1/16S392J |
| R | 1944 | | RS1/16S393J |
| R | 1945 | | RAB4C102J |
| R | 1946 | | RS1/16S222J |
| R | 1947 | | RS1/16S103J |

| Circuit Symbol and No. | Part Name | Part No. |
|---|---|---|
| R 1949 | | RS1/16S102J |
| R 1950 | | RS1/16S102J |
| R 1961 | | RS1/16S473J |
| R 1962 | | RS1/16S272J |
| R 1963 | | RS1/16S473J |
| R 1964 | | RS1/16S272J |
| R 1965 | | RS1/16S472J |
| R 1966 | | RS1/16S101J |
| R 1967 | | RS1/16S101J |
| R 1968 | | RS1/16S101J |
| R 1969 | | RS1/16S101J |
| R 1970 | | RS1/16S270J |
| R 1971 | | RS1/16S270J |
| R 1972 | | RS1/16S270J |
| R 1973 | | RS1/16S270J |
| R 1974 | | RS1/16S270J |
| R 1975 | | RS1/16S270J |
| R 1976 | | RS1/16S101J |
| R 1977 | | RS1/16S101J |
| R 1978 | | RS1/16S121J |
| R 1979 | | RS1/16S121J |
| R 1986 | | RS1/16S181J |
| R 1987 | | RS1/16S181J |
| R 1991 | | RS1/16S181J |
| R 1992 | | RS1/16S181J |

CAPACITORS

| | | |
|---|---|---|
| C 1901 | | CKSYB105K25 |
| C 1902 | | CKSRYB104K16 |
| C 1903 | | CKSRYB474K10 |
| C 1905 | | CKSRYB103K25 |
| C 1909 | | CKSRYB473K16 |
| C 1910 | | CSZSR4R7M10 |
| C 1911 | | CKSRYB103K25 |
| C 1912 | | CSZSR4R7M10 |
| C 1913 | | CKSRYB103K50 |
| C 1914 | | CSZSR4R7M10 |
| C 1941 | | CKSRYB104K25 |
| C 1942 | | CKSRYB104K16 |
| C 1943 | | CKSRYB104K25 |
| C 1944 | | CKSRYB104K25 |
| C 1945 | | CKSRYB104K25 |
| C 1946 | | CKSRYB104K16 |
| C 1947 | | CKSRYB104K25 |
| C 1961 | | CKSRYB104K25 |
| C 1962 | | CKSRYB104K25 |
| C 1972 | | CKSRYB103K25 |

## B Unit Number : CWM7986
## Unit Name : Panel Unit

| | | | |
|---|---|---|---|
| D | 1850 | LED | CL220PGC |
| S | 1850 | Push Switch(EJECT) | CSG1112 |
| R | 1852 | | RS1/16S101J |
| R | 1853 | | RS1/16S101J |
| C | 1863 | | CKSRYB223K50 |

## D Unit Number : CWX2617
## Unit Name : CD Core Unit(S9MP3)

MISCELLANEOUS

| | | | |
|---|---|---|---|
| IC | 201 | IC | UPD63760GJ |
| IC | 202 | IC | MSM51V4265EP-70TS |
| IC | 203 | IC | BA033SFP |
| IC | 301 | IC | BA5996FM |
| IC | 701 | IC | PE5268A |
| IC | 702 | IC | TC74VHCT08AFT |
| IC | 703 | IC | S-818A33AUC-BGN |
| IC | 704 | IC | PDH043A |
| Q | 101 | Transistor | 2SB1132 |
| Q | 601 | Transistor | DTC323TK |

| Circuit Symbol and No. | Part Name | Part No. |
|---|---|---|
| Q 602 | Transistor | DTC323TK |
| Q 603 | Transistor | 2SB709A |
| Q 701 | Transistor | UN2111 |
| D 101 | Diode | 1SS355 |
| D 201 | Diode | 1SR154-400 |
| D 202 | Diode | 1SR154-400 |
| D 203 | Diode | 1SR154-400 |
| D 601 | Chip Diode | MA151WA |
| L 201 | Inductor | CTF1546 |
| L 202 | Inductor | CTF1546 |
| L 204 | Inductor | CTF1546 |
| L 701 | Inductor | CTF1546 |
| L 702 | Inductor | LCYBR22J1608 |
| TH 701 | Thermistor | CCX1037 |
| X 201 | Ceramic Resonator 16.93MHz | CSS1569 |
| X 202 | Ceramic Resonator 24.57MHz | CSS1570 |
| X 701 | Ceramic Resonator 16.00MHz | CSS1576 |
| S 901 | Spring Switch(HOME) | CSN1051 |
| S 902 | Spring Switch(CLAMP) | CSN1052 |
| S 903 | Spring Switch(DSCSNS) | CSN1051 |
| S 904 | Spring Switch(12EJ) | CSN1052 |
| S 905 | Spring Switch(8EJ) | CSN1051 |

RESISTORS

| | |
|---|---|
| R 101 | RS1/10S1R5J |
| R 102 | RS1/10S1R5J |
| R 103 | RS1/10S1R5J |
| R 104 | RS1/10S1R5J |
| R 105 | RS1/10S1R5J |
| R 201 | RS1/16SS102J |
| R 202 | RS1/16SS333J |
| R 203 | RS1/16SS333J |
| R 204 | RS1/16SS333J |
| R 205 | RS1/16SS0R0J |
| R 207 | RS1/16SS0R0J |
| R 209 | RS1/16SS0R0J |
| R 212 | RS1/16SS221J |
| R 213 | RS1/16SS1002D |
| R 214 | RS1/16SS1002D |
| R 215 | RS1/16SS1002D |
| R 216 | RS1/16SS1002D |
| R 217 | RS1/16SS1002D |
| R 218 | RS1/16SS1002D |
| R 219 | RS1/16SS1002D |
| R 220 | RS1/16SS1002D |
| R 221 | RS1/16SS103J |
| R 222 | RS1/16SS103J |
| R 223 | RS1/16SS103J |
| R 224 | RS1/16SS103J |
| R 225 | RS1/16SS103J |
| R 226 | RS1/16SS393J |
| R 227 | RS1/16SS103J |
| R 228 | RS1/16SS182J |
| R 229 | RS1/16SS103J |
| R 233 | RS1/16SS183J |
| R 237 | RS1/16SS104J |
| R 238 | RS1/16SS473J |
| R 301 | RS1/16SS183J |
| R 302 | RS1/16SS822J |
| R 303 | RS1/16SS0R0J |
| R 304 | RS1/16SS183J |
| R 305 | RS1/16SS822J |
| R 306 | RS1/16SS0R0J |
| R 307 | RS1/16SS183J |

| =====Circuit Symbol and No. | | ===Part Name | Part No. |
|---|---|---|---|
| R | 308 | | RS1/16SS822J |
| R | 309 | | RS1/16SS183J |
| R | 310 | | RS1/16SS822J |
| R | 311 | | RS1/16SS0R0J |
| R | 601 | | RS1/16S101J |
| R | 602 | | RS1/16S101J |
| R | 603 | | RS1/16S223J |
| R | 604 | | RS1/16S223J |
| R | 605 | | RS1/16SS103J |
| R | 701 | | RS1/16SS0R0J |
| R | 707 | | RS1/16SS0R0J |
| R | 708 | | RS1/16SS102J |
| R | 709 | | RS1/16SS102J |
| R | 710 | | RS1/16SS102J |
| R | 711 | | RS1/16SS102J |
| R | 712 | | RS1/16SS102J |
| R | 713 | | RS1/16SS102J |
| R | 714 | | RS1/16SS473J |
| R | 715 | | RAB4CQ221J |
| R | 716 | | RAB4CQ221J |
| R | 717 | | RAB4CQ221J |
| R | 718 | | RAB4CQ221J |
| R | 719 | | RAB4CQ221J |
| R | 720 | | RS1/16SS471J |
| R | 721 | | RS1/16SS471J |
| R | 722 | | RAB4CQ221J |
| R | 723 | | RS1/16SS102J |
| R | 724 | | RN1/16SE1302D |
| R | 725 | | RS1/16SS222J |
| R | 726 | | RS1/16SS103J |
| R | 727 | | RS1/16SS473J |
| R | 728 | | RS1/16SS473J |
| R | 729 | | RS1/16SS223J |
| R | 730 | | RS1/16SS473J |
| R | 731 | | RS1/16SS104J |
| R | 732 | | RS1/16SS104J |
| R | 733 | | RS1/16SS104J |
| R | 734 | | RS1/16SS472J |
| R | 735 | | RS1/16SS473J |
| R | 737 | | RAB4CQ473J |
| R | 739 | | RAB4CQ473J |
| R | 740 | | RS1/16SS473J |
| R | 742 | | RS1/16SS104J |
| R | 744 | | RS1/16SS104J |
| R | 745 | | RS1/16SS473J |
| R | 746 | | RS1/16SS104J |
| R | 747 | | RS1/16SS104J |
| R | 748 | | RS1/16SS104J |
| R | 790 | | RD1/4PU473J |
| R | 801 | | RS1/16SS104J |
| R | 802 | | RS1/16SS473J |
| R | 803 | | RS1/16SS273J |
| R | 901 | | RS1/16SS221J |
| R | 902 | | RS1/16SS221J |
| R | 903 | | RS1/16SS221J |
| R | 904 | | RS1/16SS221J |
| R | 905 | | RS1/16SS221J |
| R | 906 | | RS1/16SS221J |

## CAPACITORS

| =====Circuit Symbol and No. | | ===Part Name | Part No. |
|---|---|---|---|
| C | 101 | | CKSSYB104K10 |
| C | 102 | | CKSSYB104K10 |
| C | 103 | | CEV101M16 |
| C | 104 | | CEV101M4 |
| C | 105 | | CKSSYB104K10 |
| C | 106 | | CKSRYB102K50 |
| C | 108 | | CKSSYB104K10 |
| C | 109 | | CEV100M16 |
| C | 201 | | CKSSYB471K50 |
| C | 202 | | CKSSYB104K10 |
| C | 203 | | CKSSYB104K10 |
| C | 204 | | CEV220M6R3 |
| C | 205 | | CKSSYB103K16 |
| C | 206 | | CKSSYB103K16 |
| C | 207 | | CEV221M4 |
| C | 208 | | CKSSYB104K10 |
| C | 209 | | CKSSYB104K10 |
| C | 210 | | CKSSYB104K10 |
| C | 211 | | CKSSYB104K10 |
| C | 216 | | CKSSYB103K16 |
| C | 217 | | CKSSYB104K10 |
| C | 218 | | CKSSYB104K10 |
| C | 219 | | CKSSYB104K10 |
| C | 220 | | CKSSYB103K16 |
| C | 221 | | CKSSYB104K10 |
| C | 222 | | CCSSCH270J50 |
| C | 223 | | CCSSCJ3R0C50 |
| C | 224 | | CKSSYB104K10 |
| C | 225 | | CKSSYB103K16 |
| C | 226 | | CCSSCH680J50 |
| C | 227 | | CCSSCH470J50 |
| C | 228 | | CKSSYB682K25 |
| C | 230 | | CKSSYB104K10 |
| C | 232 | | CKSSYB104K10 |
| C | 233 | 47µF/6.3V | CCH1436 |
| C | 234 | | CEV221M4 |
| C | 235 | | CKSRYB224K16 |
| C | 237 | | CKSSYB104K10 |
| C | 238 | | CKSSYB104K10 |
| C | 301 | | CKSSYB331K50 |
| C | 302 | | CKSSYB331K50 |
| C | 303 | | CKSSYB472K25 |
| C | 304 | | CKSSYB472K25 |
| C | 305 | | CEV101M16 |
| C | 306 | | CKSRYB224K16 |
| C | 601 | | CCSRCH102J50 |
| C | 602 | | CCSRCH102J50 |
| C | 603 | | CSZS4R7M10 |
| C | 604 | | CSZS4R7M10 |
| C | 701 | | CKSSYB104K10 |
| C | 702 | | CKSSYB471K50 |
| C | 703 | | CKSSYB103K16 |
| C | 704 | | CEV1R0M50 |
| C | 705 | | CKSSYB104K10 |
| C | 706 | | CKSSYB471K50 |
| C | 707 | | CKSSYB104K10 |
| C | 708 | | CKSSYB104K10 |
| C | 709 | | CKSSYB103K16 |
| C | 710 | | CKSSYB104K10 |
| C | 711 | 10µF/10V | CCH1349 |
| C | 712 | | CKSRYB224K16 |
| C | 713 | | CKSSYB104K10 |
| C | 714 | | CKSSYB104K10 |
| C | 715 | | CKSSYB103K16 |
| C | 716 | | CKSSYB103K16 |
| C | 901 | | CKSSYB104K10 |
| C | 903 | | CCSRCH101J50 |

## Miscellaneous Parts List

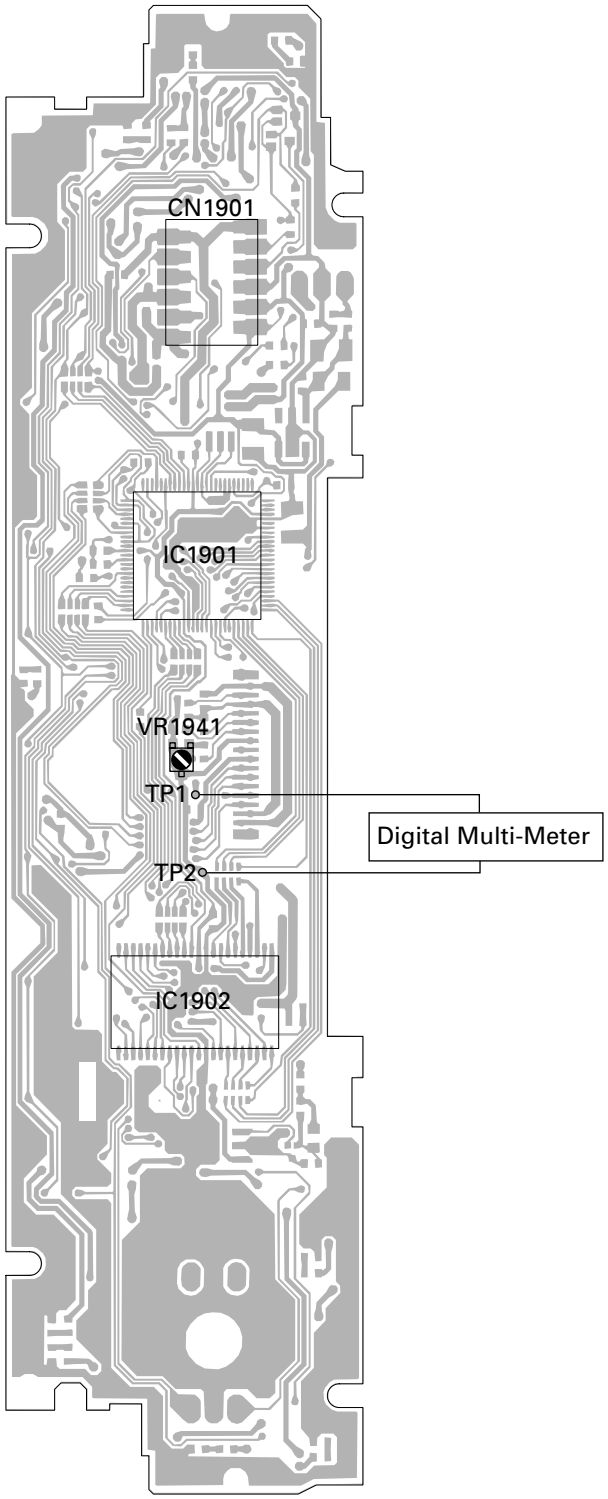
| | | | |
|---|---|---|---|
| | | Pickup Unit(Service)(P9MP3) | CXX1550 |
| M | 1 | Motor Unit(SPINDLE) | CXB6007 |
| M | 2 | Motor Unit(LOADING/CARRIAGE) | CXB5903 |

# 6. ADJUSTMENT

## 6.1 OEL UNIT ADJUSTMENT

● **Adjustment point**

KEYBOARD UNIT (SIDE B)




**<When the OEL Unit has been replaced>**

1. Use VR1941 to adjust the resistance between TP1 and TP2 to 6.60kΩ.

## 6.2 CD ADJUSTMENT

1) Precautions

- This unit uses a single power supply (+3.3V) for the regulator. The signal reference potential, therefore, is connected to REFO1(approx. 1.65V) instead of GND.
  If REFO1 and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.
  Do not connect the negative probe of the measuring equipment to REFO1 and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO1 with the channel 2 negative probe connected to GND.
  Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.
  If by accident REFO1 comes in contact with GND, immediately switch the regulator or power OFF.

- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.

- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.

- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.

- The RFI and RFO signals are easy to oscillate because of a wide band. When observing them, insert a resistor of about 1 kΩ to the series.

- This equipment will not guarantee the load ejection operation when the mechanical unit is turned upside down. In particular, if the ejection operation is incorrectly performed and recovery is disabled, the recovery is enabled by resetting a product or turning ACC off to on.

2) Test Mode

This mode is used for adjusting the CD mechanism module of the device.

- Test mode starting procedure
  Reset while pressing the **4** and **6** keys together.

- Test mode cancellation
  Switch ACC, back-up OFF.

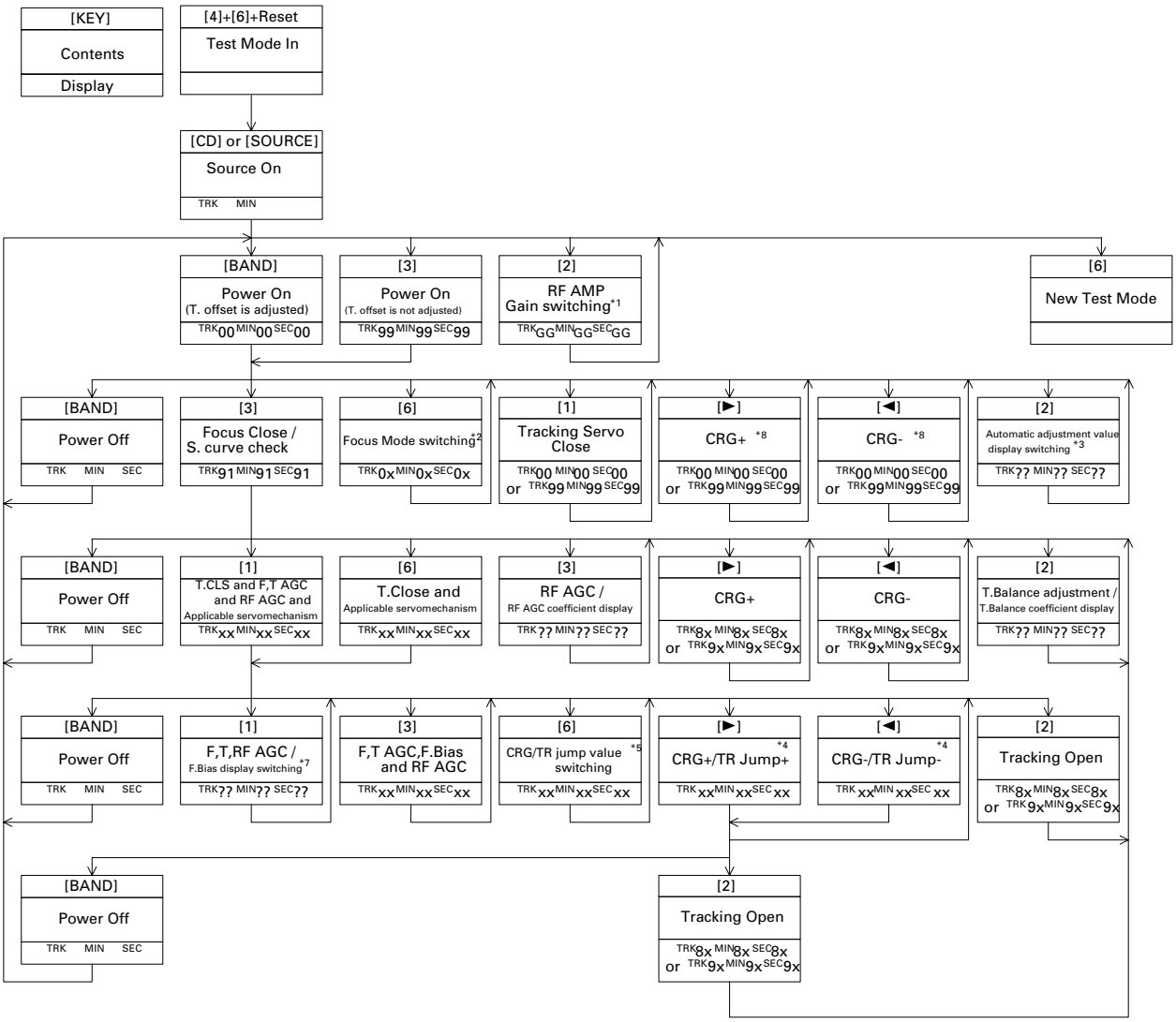
- After pressing the EJECT key, do not press any other key until the disk is completely ejected.

- If the ► or ◄ key is pressed while focus search is in progress, immediately turn the power off (otherwise the actuator may be damaged due to adhesion of the lenses).

- Jump operation of TRs other than 100TR continues after releasing the key. CRG move and 100TR jump operations are brought into the “Tracking close” status when the key is released.

- Powering Off/On resets the jump mode to “Single TR(91)”, the RF AMP gain setting to 0 dB, and the automatic adjustment value to the initial value.

## ● Flow Chart




*1) TYP (TRK MIN SEC) → +12dB (TRK12 MIN12 SEC12)

*2) Focus Close setting (TRK00 MIN00 SEC00 or TRK99 MIN99 SEC99) → S. curve check setting (TRK01 MIN01 SEC01) → F. EQ measurement setting (TRK02 MIN02 SEC02)

*3) F.Offset Display → T.Offset Display → Switch to the order of the original display

*4) 1TR/32TR/100TR

*5 Single TR (TRK91 MIN91 SEC91 or TRK81 MIN81 SEC81) → 32TR (TRK92 MIN92 SEC92 or TRK82 MIN82 SEC82) → 100TR (TRK93 MIN93 SEC93 or TRK83 MIN83 SEC83) → CRG Move (TRK94 MIN94 SEC94 or TRK84 MIN84 SEC84)

*6) Only at the time of CRG move or 100TR jump

*7) TRK/MIN/SEC → F.AGC Gain → T.AGC Gain → F.Bias → RF AGC Gain

*8) CRG motor voltage = 2 [V]

| [Key] | Operation | |
|---|---|---|
| | Test Mode | New Test Mode |
| [BAND] | Power On/Off | Error occurrence time/ cause display switching |
| [►] | CRG +/TR Jump+ (Direction of the external surface) | TRK+/FF |
| [◄] | CRG -/TR Jump- (Direction of the internal surface) | TRK-/REV |
| [1] | T.CLS and AGC and Applicable servomechanism/ AGC,AGC display switching | SCAN |
| [2] | RF Gain switching/Offset adjustment display/ T.Balance adjustment/T.OPN | MODE |
| [3] | F.CLS,S.Curve/Rough Servo and RF AGC/ F,T,RF AGC | (ITP) |
| - | SPDL 1X/2X switching (Double-speed compatibility only) | - |
| - | Error rate measurement | - |
| [6] | F.Mode switching/T.CLS/CRG,TR Jump switching | Auto/Manual switching |

## 6.3 CHECKING THE GRATING AFTER CHANGING THE PICKUP UNIT

• **Note :**
The grating angle of the PU unit cannot be adjusted after the PU unit is changed. The PU unit in the CD mechanism module is adjusted on the production line to match the CD mechanism module and is thus the best adjusted PU unit for the CD mechanism module. Changing the PU unit is thus best considered as a last resort. However, if the PU unit must be changed, the grating should be checked using the procedure below.

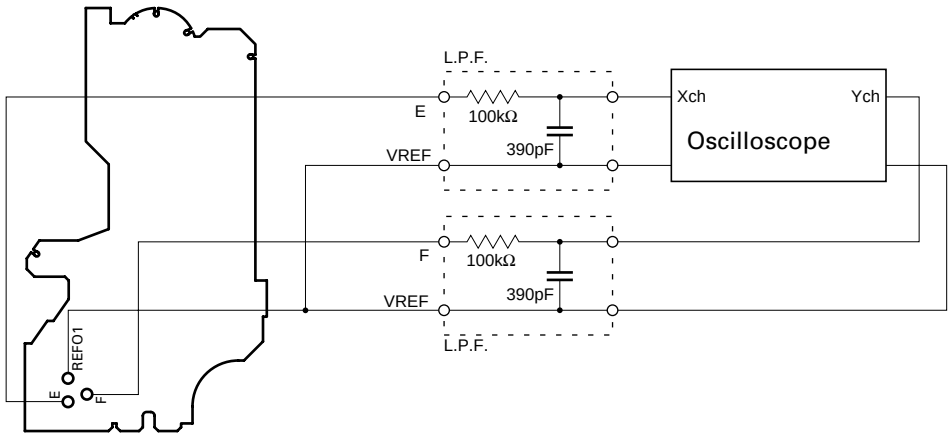
• **Purpose :**
To check that the grating is within an acceptable range when the PU unit is changed.

• **Symptoms of Mal-adjustment :**
If the grating is off by a large amount symptoms such as being unable to close tracking, being unable to perform track search operations, or taking a long time for track searching.

• **Method :**

| | |
|---|---|
| • Measuring Equipment | • Oscilloscope, Two L.P.F. |
| • Measuring Points | • E, F, REFO1 |
| • Disc | • ABEX TCD-782 |
| • Mode | • TEST MODE |

CD CORE UNIT(S9MP3)




• **Checking Procedure**
1. In test mode, load the disc and switch the 5V regulator on.
2. Using the ► and ◄ buttons, move the PU unit to the innermost track.
3. Press key **3** to close focus, the display should read "91". Press key **2** to implement the tracking balance adjustment the display should now read "81". Press key **3**. The display will change, returning to "81" on the fourth press.
4. As shown in the diagram above, monitor the LPF outputs using the oscilloscope and check that the phase difference is within 75° . Refer to the photographs supplied to determine the phase angle.
5. If the phase difference is determined to be greater than 75° try changing the PU unit to see if there is any improvement. If, after trying this a number of times, the grating angle does not become less than 75° then the mechanism should be judged to be at fault.

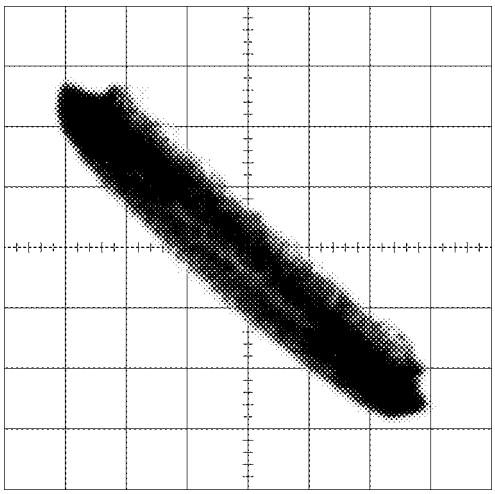
• **Note**
Because of eccentricity in the disc and a slight misalignment of the clamping center the grating waveform may be seen to "wobble" ( the phase difference changes as the disc rotates). The angle specified above indicates the average angle.

• **Hint**
Reloading the disc changes the clamp position and may decrease the "wobble".

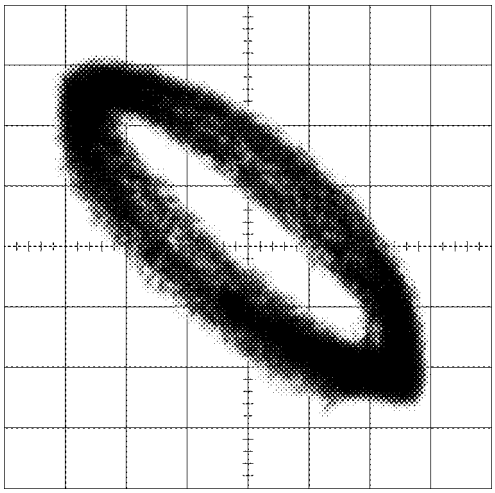
**Grating waveform**

Ech → Xch 20mV/div, AC
Fch → Ych 20mV/div, AC

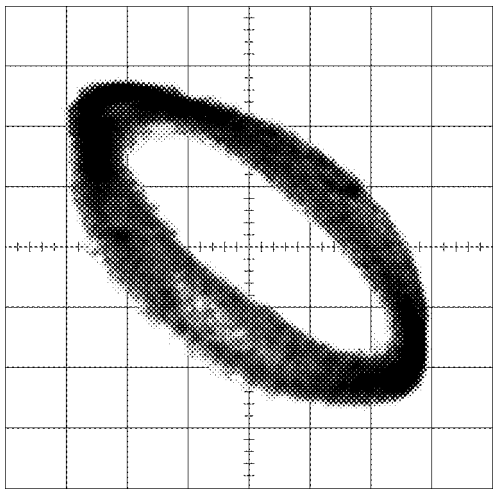
0°



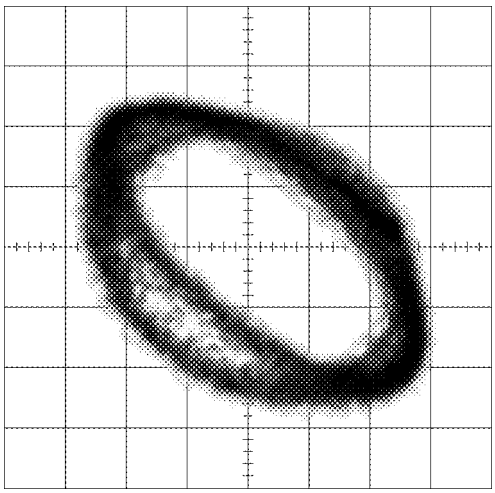
30°



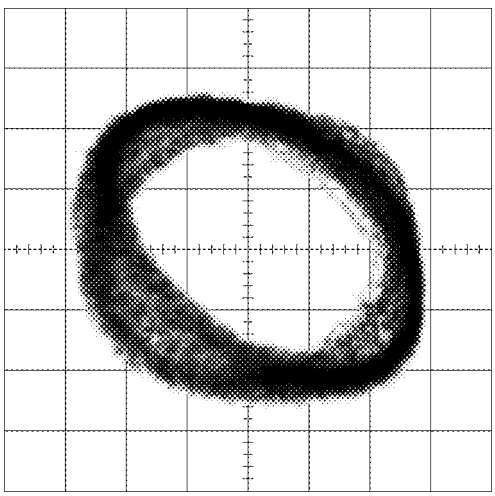
45°



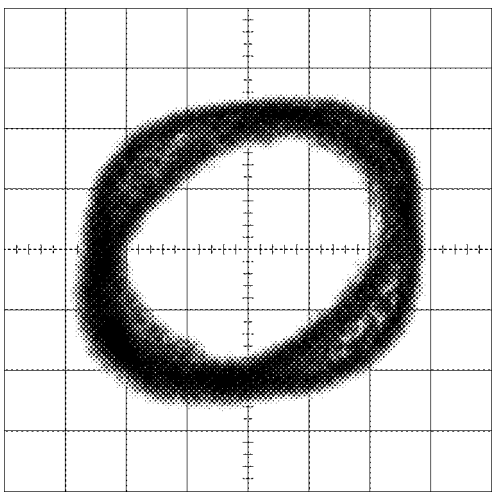
60°



75°



90°



## 6.4 CD TEST MODE

### ● Error Messages

If a CD is not operative or stopped during operation due to an error, the error mode is turned on and cause(s) of the error is indicated with a corresponding number. This arrangement is intended at reducing nonsense calls from the users and also for facilitating trouble analysis and repair work in servicing.

(1) Basic Indication Method

1) When SERRORM is selected for the CSMOD (CD mode area for the system), error codes are written to DMIN (minutes display area) and DSEC (seconds display area). The same data is written to DMIN and DSEC. DTNO remains in blank as before.

2) Head unit display examples

Depending on display capability of LCD used, display will vary as shown below. xx contains the error number.

| 8-digit display | 6-digit display | 4-digit display |
|---|---|---|
| ERROR–xx | ERR–xx | E–xx |

(2) Error Code List

| Code | Class | Displayed error code | Description of the code and potential cause(s) |
|---|---|---|---|
| 10 | Electricity | Carriage Home NG<br>SERVO LSI Communication Error | CRG can't be moved to inner diameter.<br>CRG can't be moved from inner diameter.<br>→ Failure on home switch or CRG move mechanism.<br>Communication error between microcomputer and SERVO LSI. |
| 11 | Electricity | Focus Servo NG | Focusing not available.<br>→ Stains on rear side of disc or excessive vibrations on REWRITABLE. |
| 12 | Electricity | Spindle Lock NG<br>Subcode NG | Spindle not locked. Sub-code is strange (not readable).<br>→ Failure on spindle, stains or damages on disc, or excessive vibrations.<br>A disc not containing CD-R data is found.<br>Turned over disc are found, though rarely.<br>CD signal error. |
| 17 | Electricity | Setup NG | AGC protection doesn't work. Focus can be easily lost.<br>→ Damages or stains on disc, or excessive vibrations on REWRITABLE. |
| 30 | Electricity | Search Time Out | Failed to reach target address.<br>→ CRG tracking error or damages on disc. |
| 44 | Electricity | ALL Skip | Skip setting for all track.<br>(CD-R/RW) |
| 50 | Mechanism | CD On Mech Error | Mechanical error during CD ON.<br>→ Defective loading motor, mechanical lock and mechanical sensor. |
| A0 | System | Power Supply NG | Power (VD) is ground faulted.<br>→ Failure on SW transistor or power supply (failure on connector). |

Remarks: Mechanical errors are not displayed (because a CD is turned off in these errors).
Unreadable TOC does not constitute an error. An intended operation continues in this case.
Upper digits of an error code are subdivided as shown below:
1x: Setup relevant errors, 3x: Search relevant errors, Ax: Other errors.

## ● New Test Mode

S-CD plays the same way as before.

If an error such as off focus, spindle unlocking, unreadable sub-code, or sound skipping occurs after setup, its cause and time occurred (in absolute time) are displayed.

During setup, operational status of the control software is displayed.

These displays and functions are prepared for enhancing aging in the servicing and efficiency of trouble analysis.

(1) Shifting to the New Test Mode

① Turn on the current test mode by starting the reset from the key.

② Select S-CD for the source through the specified procedure including use of the [SOURCE] key, and inserting the disc. Then, press the [Jump Mode Selector] key while maintaining the regulator turned off.

③ After the above operations, the new test mode remains on irrespective of whether the S-CD is turned on or off. You can reset the new test mode by turning on the reset start.

(2) Key Correspondence

| Key | Test mode | | New test mode | |
|---|---|---|---|---|
| | Regulator Off | Regulator On | In-play | Error Production |
| BAND | To regulator on | To regulator off | – | Time/Err.No. switching |
| ► | – | FWD-Kick | FF/TR+ | – |
| ◄ | – | REV-Kick | REV/TR- | – |
| 1 | – | Tracking Close | Scan | – |
| 2 | – | Tracking Open | Mode | – |
| 3 | – | Focus Close | – | – |
| – | – | Focus Open | – | – |
| – | – | Jump Off | – | – |
| 6 | To new test mode | Jump mode switching | Auto/Manu | – |

Note: Eject and CD on/off is performed in the same procedure as that for the normal mode.

(3) Cause of Error and Error Code

| Code | Class | Contents | Description and cause |
|---|---|---|---|
| 40 | Electricity | Off focus detected. | FOK goes low.<br>→ Damages/stains on disc, vibrations or failure on servo. |
| 41 | Electricity | Spindle unlocked. | LOCK = Low continued for 150 msec.<br>→ Damages/stains on disc, vibrations or failure on servo. |
| 42 | Electricity | Sub-code unreadable. | Sub-code was unreadable for 500 msec.<br>→ Damages/stains on disc, vibrations or failure on servo. |
| 43 | Electricity | Sound skipping detected. | Last address memory function was activated.<br>→ Damages/stains on disc, vibrations or failure on servo. |

Note: Mechanical errors during aging are not displayed.

(4) Display of Operational Status during Setup

| Status No. | Contents | Protective action |
|---|---|---|
| 21 | Focus search start | Focus search timeout. |
| 22 | Focus search 2 | Focus search timeout. |
| 23 | Focus search 3 | Focus search timeout. |
| 24 | Focus search 4 | Focus search timeout. |
| 25 | Focus search(Setup protection) | Focus slips off. |
| 26 | Focus search(Fast recovery) | Focus slips off. |
| 27 | RF detection | Focus slips off. |
| 28 | Spindle rough servocontrol | Focus slips off. |
| 29 | Tracking balance adjustment start | Focus slips off. |
| 30 | Tracking balance adjustment 2 | Focus slips off. |
| 31 | Tracking balance adjustment 3 | Focus slips off. |
| 32 | Tracking close start(Spindle stationary servocontrol setting) | Focus slips off. |
| 33 | Tracking close 2 | Focus slips off. |
| 34 | Tracking close 3 | Focus slips off. |
| 35 | Focus/Tracking AGC start | Focus slips off. |
| 36 | Focus/Tracking AGC 2 | Focus slips off. |
| 37 | Focus/Tracking AGC 3 | Focus slips off. |
| 38 | Focus/Tracking AGC 4 | Focus slips off. |
| 39 | Focus/Tracking AGC 5 | Focus slips off. |
| 40 | Focus/Tracking AGC 6 | Focus slips off. |
| 41 | Focus/Tracking AGC 7 | Focus slips off. |
| 42 | Focus/Tracking AGC 8 | Focus slips off. |
| 43 | FE bias start | Focus slips off. |
| 44 | FE bias 2 | Focus slips off. |
| 45 | RF AGC start | Focus slips off. |
| 46 | RF AGC 2 | Focus slips off. |
| 47 | Lock check start | Focus slips off. |
| 48 | Lock is being checked | Focus slips off. |
| 49 | Subcode check start | Focus slips off, spindle lock is not performed. |
| 50 | Subcode is being checked | Focus slips off, no subcode can be read. |

(5) Display Examples

1) During Setup

| 8-digit display, 6-digit display | 4-digit display(Auto setting) | 4-digit display(Manual setting) |
|---|---|---|
| TNO. Min Sec | TNO. | Min Sec |
| 11 11' 11" | 11 | 11' 11" |

2) During Operation (TOC read, TRK search, Play, FF and REV)

The same as in the normal mode.

3) When a Protection Error Occurred

(A) Error display ((A)←→(B), (C) : BAND key)

| 8-digit display | 6-digit display | 4-digit display |
|---|---|---|
| ERROR-xx | ERR-xx | E-xx |

(B) Error occurrence timing display in track no. ((B)←→(C) : Auto/Manual key)

| 8-digit display, 6-digit display | 4-digit display(Auto setting) |
|---|---|
| TNO. Min Sec | TNO. |
| 10 40' 05" | 10 |

(C) Error occurrence timing display in absolute time. ((B)←→(C) : Auto/Manual key)

| 8-digit display, 6-digit display | 4-digit display(Manual setting) |
|---|---|
| TNO. Min Sec | Min Sec |
| 10 40' 05" | 40' 05" |

# 7. GENERAL INFORMATION

## 7.1 DIAGNOSIS

### 7.1.1 DISASSEMBLY

● **Removing the Case (not shown)**

1. Remove the Case.

● **Removing the Grille Panel Assy (Fig.1)**

1 Remove the two screws and then remove the Grille Panel Assy.

● **Removing the CD Mechanism Module (Fig.1)**

2 Remove the four screws and then remove the CD Mechanism Module.

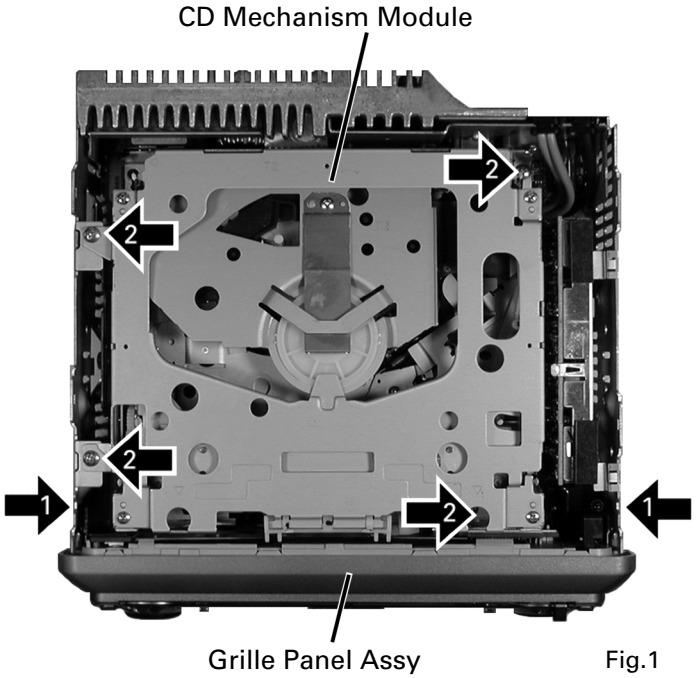



Fig.1

● **Removing the Tuner Amp Unit (Fig.2)**

1 Remove the two screws.

2 Remove the three screws.

3 Straight the tabs at three locations indicated.

4 Remove the screw and then remove the Tuner Amp Unit.

*) Tuner Amp Unit is different partially from this photo.

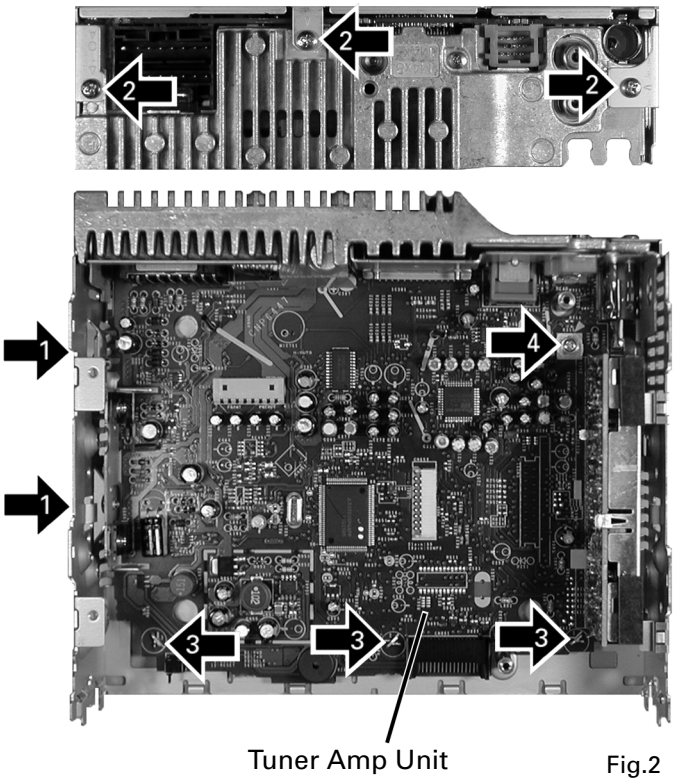



Fig.2

## ● Removing the OEL Unit

1. Apply hot air to the cable pins for the anode terminal using a blower used for removing a flat-packaged IC or something like that. When all the pins are peeling off from the PCB, pinch the cable with a pair of tweezers and remove it slowly from the PCB. (Fig.3)

* Be careful not to remove other electrical parts when you use a blower. Especially, when hot air is appropriated to the VR1902 too much, the volume will destroy.
* Flexible cable may not remove easily by transforming the Bosses by the hot air of the Blower.

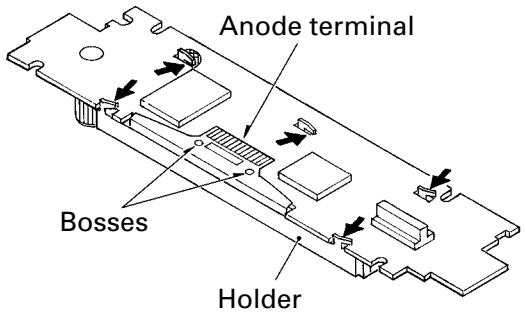



Fig.3

2. Five tabs are extended until becoming straight in the direction of the arrow and then remove the Holder. (Fig.3)
3. Slowly set up the OEL Unit. At this time, the stress is prevented from hanging to flexible cable in the Cathode terminal. (Fig.4)
4. The Cathode terminal is removed according to the procedure same as the Anode terminal, and the OEL Unit is removed. (Fig.4)
5. Remove the Holder. (Remove after removing the Cathode terminal without fail.) (Fig.4)

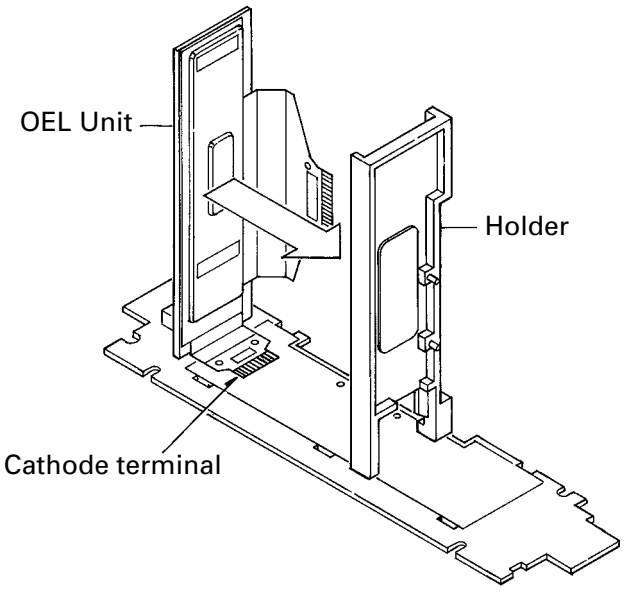



Fig.4

## ● Installing the OEL Unit

1. Install the Holder in the OEL Unit. (Fig.5)
2. When soldering the flexible cable for the Cathode terminal on the PCB, use a pair of tweezers. First, insert the tips of tweezers into 2 holes in the flexible cable, then into the 2 holes in the PCB. (Fig.5)
3. Position the flexible cable on the PCB so that their lands touch each other. (Fig.5)
4. Apply solder to each pin of the flexible cable. (Fig.5)

* Appropriate soldering iron lightly so that the stress should not hang to Flexible cable.

5. Lay down the OEL Unit. (Fig.5)
6. Install the Holder. (Fig.3)
7. When soldering the flexible cable for the Anode terminal on the PCB, first, insert the Bosses on the PCB into the 2 holes in the flexible cable. Then, take the same procedures 2 and 3 as that for the Cathode terminal to solder the cable pins. (Fig.3)

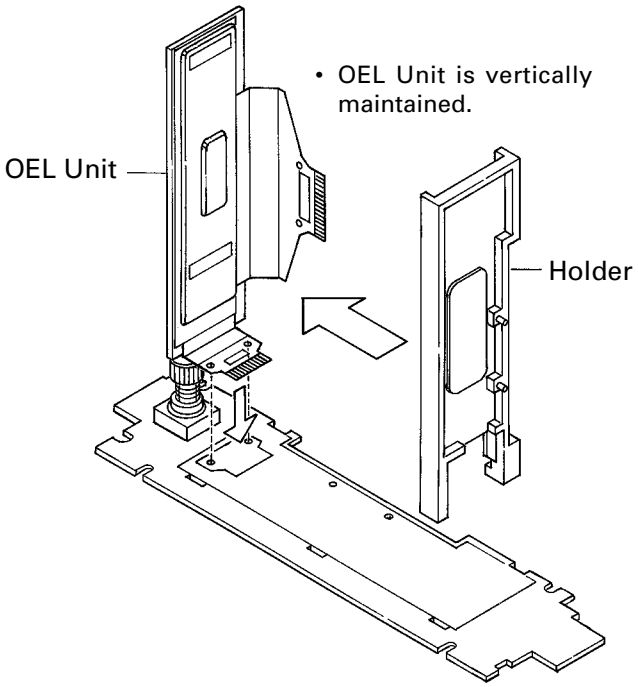
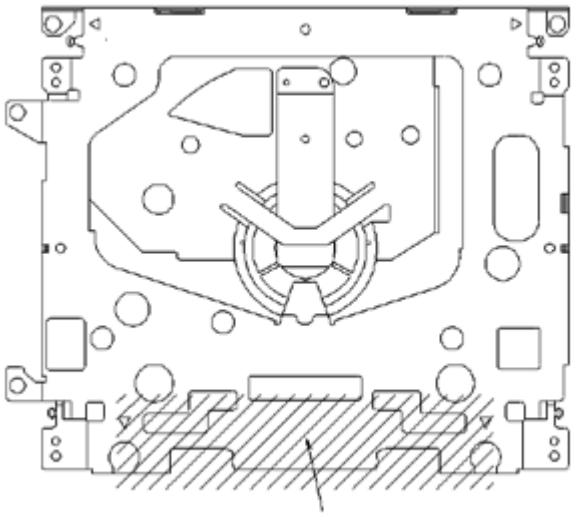



Fig.5

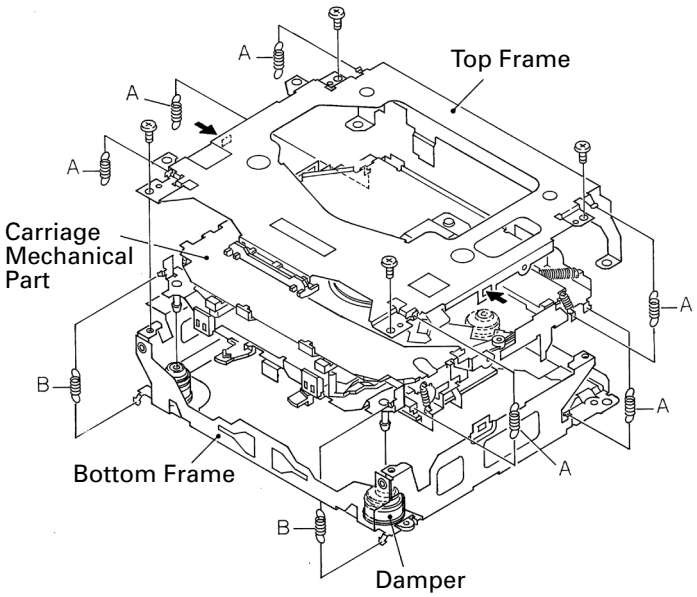
### ● How to hold the Mechanical Unit

1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



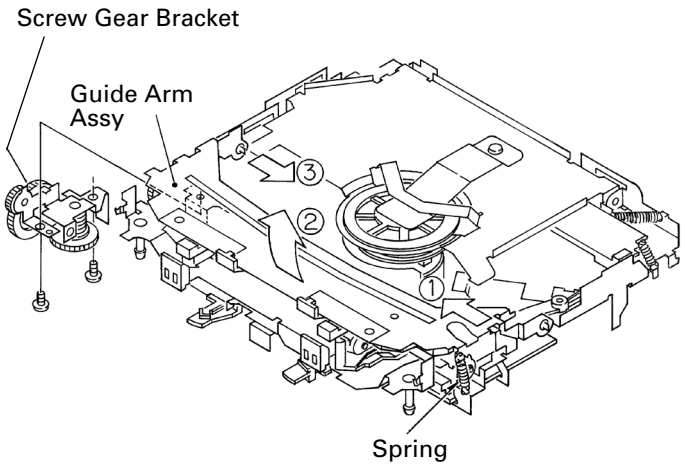

### ● How to remove the Top and Bottom Frame

1. When the disk is in "clamp" state, unlock Spring A (6 pieces) and Spring B (2 pieces), and unscrew screws (4 pieces).
2. Unlock each 1 of pawl at the both side of the frame, then remove the top frame.
3. Remove the Carriage Mechanical part in such way that; you remove the mechanical part from 3 pieces of Damper while slowly pulling up the part.
4. Now, the top frame has been removed, and under this state, fix the genuine Connector again, and eject the disk.
   (Caution)
   When you reassemble the Carriage Mechanical part, apply a bit of alcohol to Dampers.



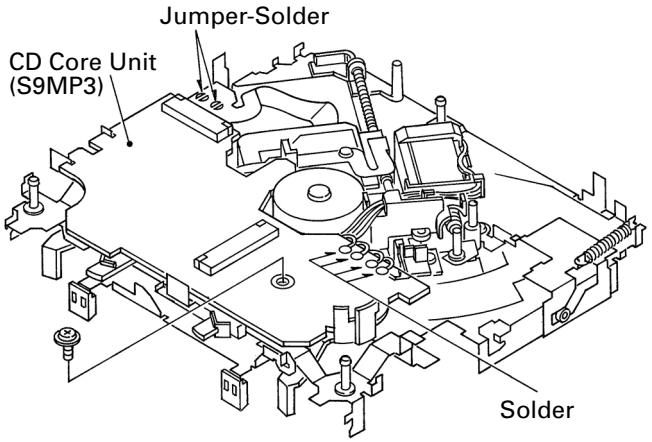

### ● How to remove the Guide Arm Assy

1. Unlock the spring (1 piece) at the right side of the assembly.
2. Unscrew screws (2 pieces), then remove the Screw Gear Bracket.
3. Shift the Guide Arm Assy to the left and slowly rotate it to the upper direction.
4. When the Guide Arm Assy rotates approximately 45 degree, shift the Assy to the right side direction and remove it.



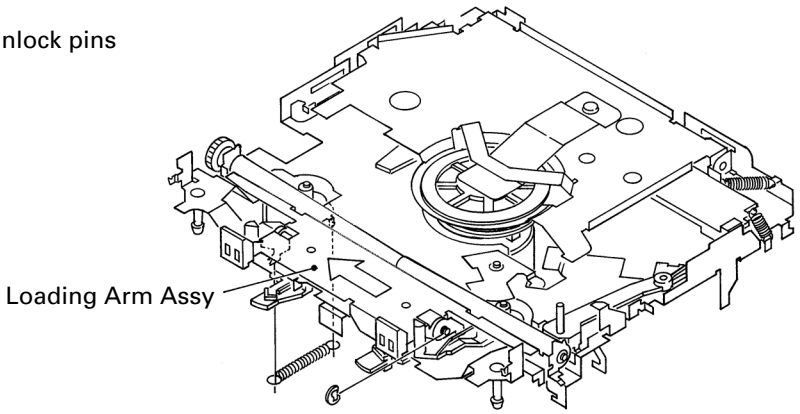
### ● How to remove the CD Core Unit(S9MP3)

1. Give jumper-solder treatment to the Flexible Wire of the Pickup unit, then remove the wire from the Connector.
2. Remove all 4 points of solder-treatment on the Lead Wire. Also, unscrew the screw(1 piece).
3. Then, Remove the CD Core Unit(S9MP3).
   (Caution)
   Be careful not to damage SW when you reassemble the Control Unit into the device.



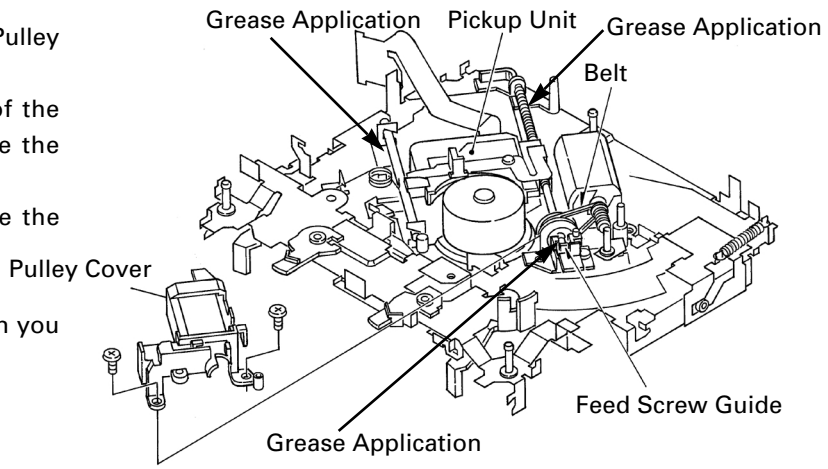

### ● How to remove the Loading Arm Assy

1. Unlock the spring (1 piece) and remove the E ring (1 piece) of the Fulcrum Shaft.
2. Shift the arm to the left side direction and unlock pins (2 pieces).

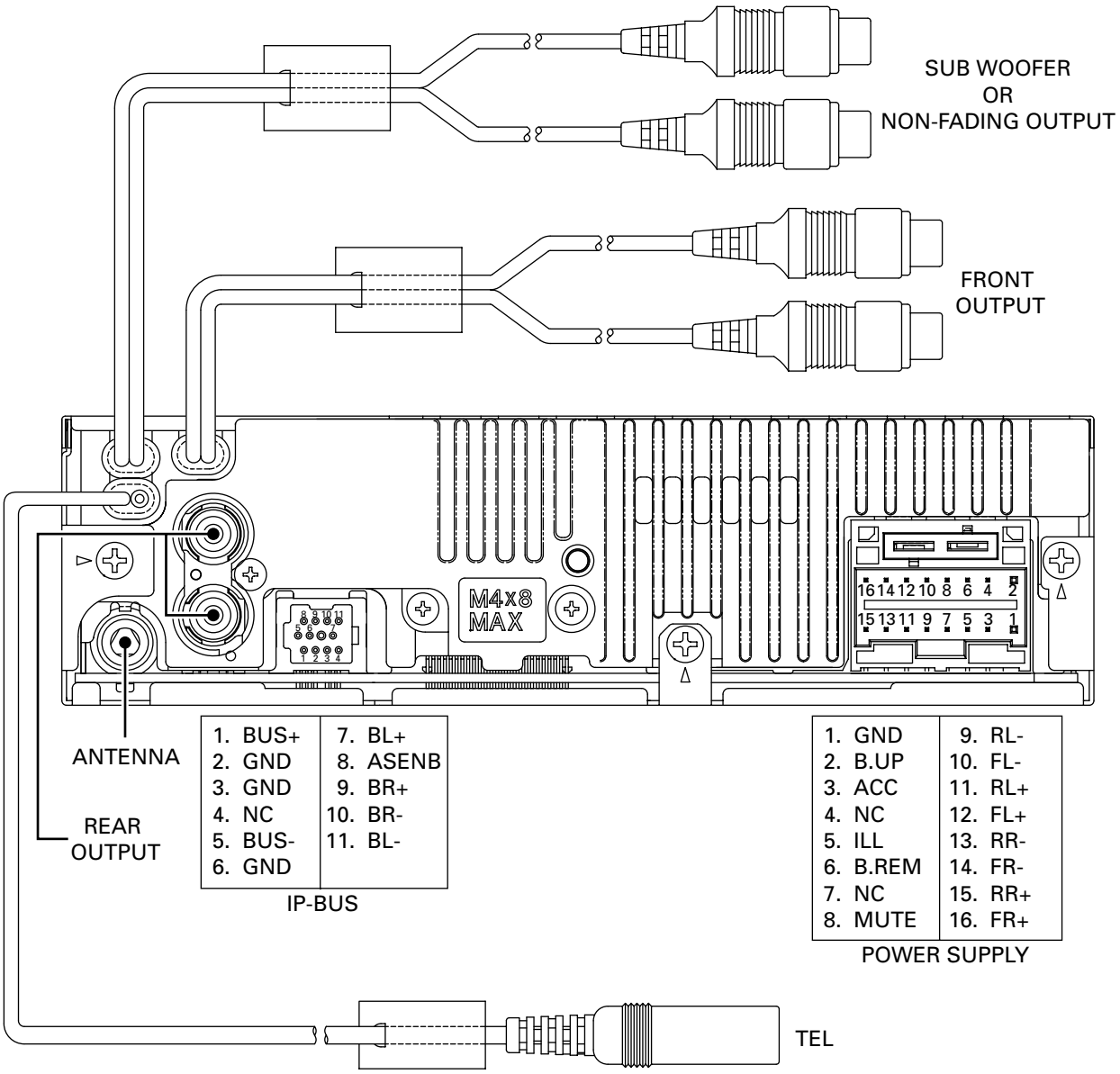



### ● How to remove the Pickup Unit

1. Unscrew 2 pieces of screws, then remove the Pulley Cover.
2. Remove the Feed Screw unit from the pawl of the Feed Screw Guide (The pawl is located inside the guide).
3. Remove the belt from the Pulley, then remove the Pickup unit.
   (Caution)
   Make sure not to stain the belt with grease when you fix the belt.



## 7.1.2 CONNECTOR FUNCTION DESCRIPTION



## 7.2 IC

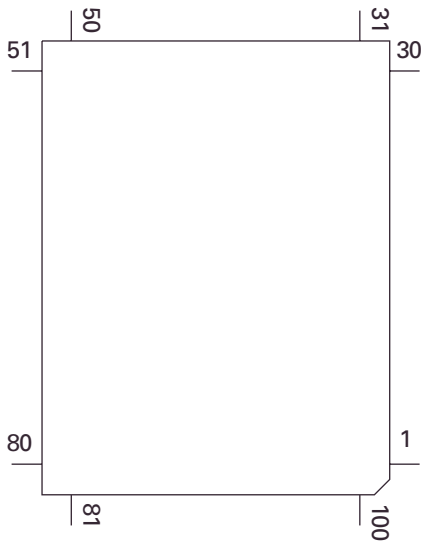
PD5702A
PAL007A
PML009A
PD5706A
S-818A33AUC-BGN
TSOP1840SB3V
PD8088A
PDH0044A
UPD63760GJ
BA033SFP
MSM51V4265EP-70TS
BA5996FM
PE5268A
PDH043A

● **Pin Functions (PD5702A)**

| Pin No. | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | TUNPDO | O | TUNER:Data output(PLL) |
| 2 | TUNPCK | O | TUNER:Clock output(PLL) |
| 3 | EMUTE | O | EVOL:Mute output (Not used) |
| 4 | VST | O | EVOL:Strobe output |
| 5 | VDT | O | EVOL:Data output |
| 6 | NC | | Not used |
| 7 | VCK | O | EVOL:Clock output |
| 8 | BYTE | | Vss |
| 9 | CNVSS | | Vss |
| 10 | TELIN | I | TEL:Telephone mute input |
| 11 | HTELPW | O | TEL:Microphone control output |
| 12 | RESET | I | Reset input(RESET) |
| 13 | XOUT | | Clock output |
| 14 | VSS | | Power supply input(Vss) |
| 15 | XIN | | Clock input |
| 16 | VCC | | Power supply input(Vcc) |
| 17 | NC | | Not used(Vcc)(Pull up) |
| 18 | RCK | I | RDS:Clock input |
| 19 | LDET | I | RDS:PLL lock detection input |
| 20 | DALMON | O | DFS alarm output |
| 21 | RX2 | I | IPBUS:Input 2 |
| 22 | OELPW | O | OEL power supply output |
| 23 | SYSPW | O | System power control output |
| 24 | PEE | O | Beep tone output |
| 25 | RDS57K | I | RDS:57KHz pulse count input |
| 26 | ROMCS | O | External ROM:Chip select output |
| 27 | ROMCK | O | External ROM:Clock output |
| 28 | ROMDATA | I/O | External ROM:Data input / output |
| 29 | RX | I | IPBUS:Data input |
| 30 | TX | O | IPBUS:Data output |
| 31 | BSO | O | PBUS:Data output |
| 32 | BSI | I | PBUS:Data input |
| 33 | BSCK | O | PBUS:Clock output |
| 34 | NC | | Not used |
| 35 | DPDT | O | GRILLE:Display data output |
| 36 | KYDT | I | GRILLE:Key data input |
| 37, 38 | ROT1, 0 | I | Rotary encoder pulse input 1, 0 |
| 39 | PCL | O | Clock adjustment output |
| 40 | SWVDD | O | GRILLE:Chip enable output |
| 41 | DSENS | I | Detach sense input |
| 42 | FLPILM | O | Inside of flap illumination output |
| 43 | ILMPW | O | Illumination output |
| 44 | EJTIN | I | EJECT key input |
| 45 | DRST | O | RDS:Reset output |
| 46 | RDSLK | I | RDS:Lock signal input |
| 47 | RDT | I | RDS:Data input |
| 48 | AM/FM | O | TUNER:Decoder power supply control output |
| 49 | ST | I | TUNER:Stereo input |
| 50 | SD | I | TUNER:SD input |
| 51 | NL2DT | I | RDS:Noise level 2 input |

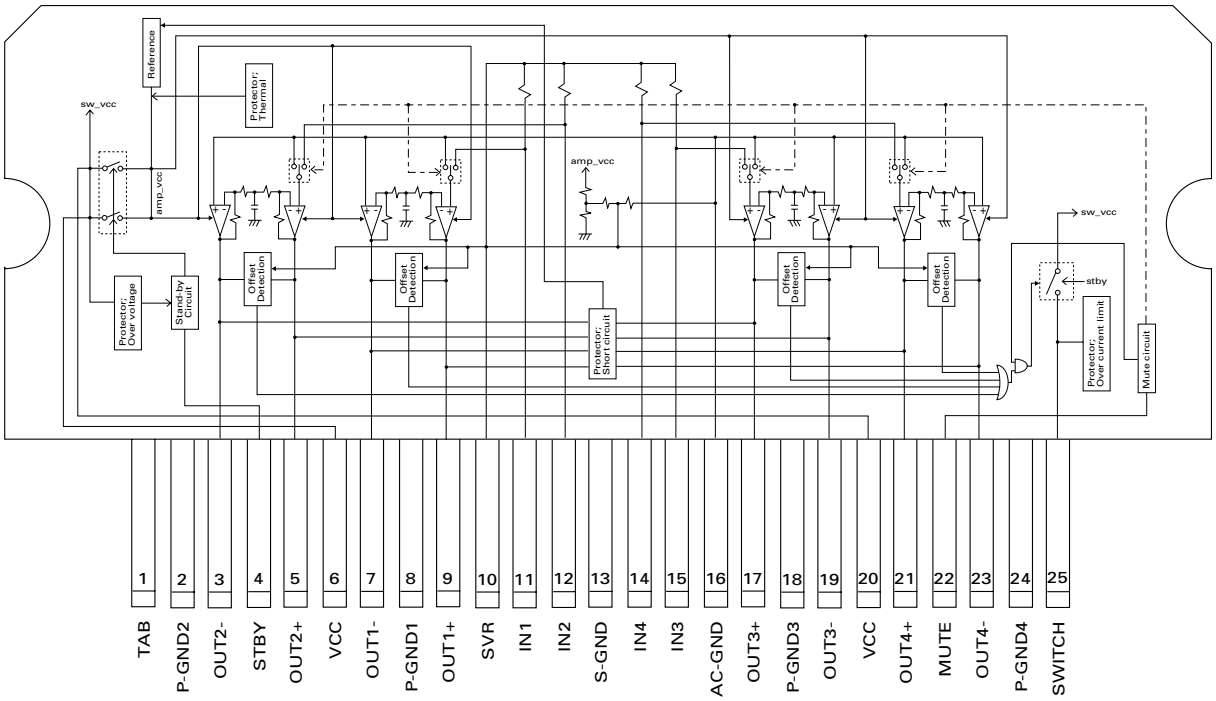
| Pin No. | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 52 | TMUTE | O | RDS:Mute output |
| 53 | SDBW | I | RDS:In case of NF, SD input |
| 54 | NC | | Not used |
| 55 | BRST | O | PBUS:Reset output |
| 56 | BRXEN | I/O | PBUS:Comunication input/output |
| 57 | BSRQ | I | PBUS:Comunication request input |
| 58-61 | NC | | Not used |
| 62 | VCC | | Power supply input(Vcc) |
| 63 | CSENSOUT | O | CSENS output |
| 64 | VSS | | Power supply input(Vss) |
| 65-69 | NC | | Not used |
| 70 | HTELM | O | TEL:Mute output for handsfree (Not used) |
| 71 | TUNPCE2 | O | TUNER:Chip enable output(EEPROM) |
| 72 | TUNPCE | O | TUNER:Chip enable output(PLL) |
| 73 | BSENS | I | Backup sense |
| 74 | ASENS | I | ACC sense |
| 75 | CURRQ | O | RDS:Voltage FIX output |
| 76 | LOCH | O | TUNER:Local H output |
| 77 | LOCL | O | TUNER:Local L output |
| 78-80 | NC | | Not used |
| 81 | IPPW | O | IPBUS:Driver power supply control output |
| 82 | ASENBO | O | IPBUS:Slave ACC sense output |
| 83 | ISENS | I | Illumination sense input |
| 84, 85 | MODEL1, 0 | I | Model input 1, 0 (Not used) |
| 86 | RECIVE | O | During RDS data reception output |
| 87 | MUTE | O | Mute output |
| 88 | TESTIN | I | Test program input |
| 89-91 | NC | | Not used |
| 92 | LVLINR | I | Level indicator R ch input |
| 93 | CSENS | I | Flap open/close sense input |
| 94 | LVLINL | I | Level indicator L ch input |
| 95 | NL1 | I | RDS:Noise level input 1 |
| 96 | AVSS | | AD converter power supply input(Vss) |
| 97 | SL | I | TUNER:Signal level input |
| 98 | VREF | | AD converter reference voltage(Vref) |
| 99 | AVCC | | AD converter power supply input(Vcc) |
| 100 | TUNPDI | I | TUNER:Data input |

*PD5702A

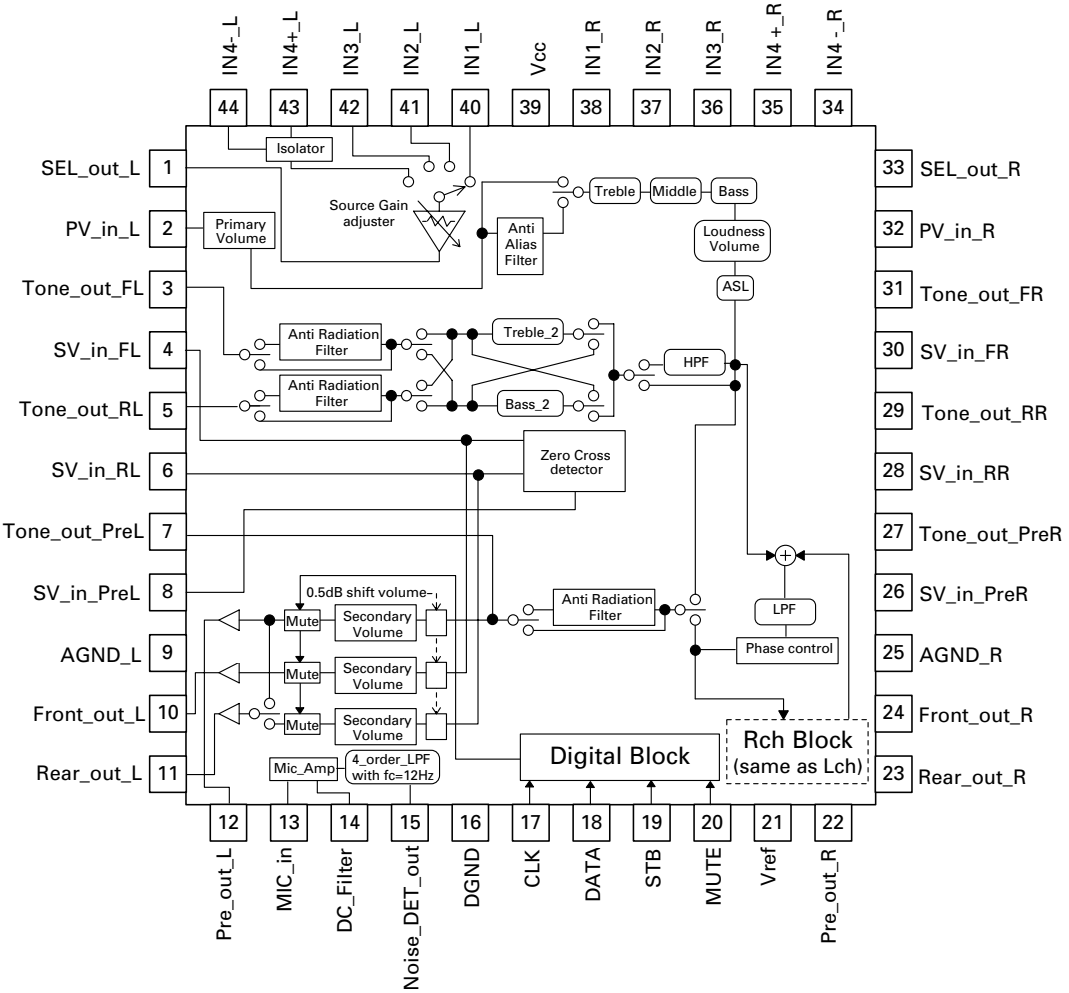



IC's marked by * are MOS type.
Be careful in handling them because they are very liable to be damaged by electrostatic induction.

PAL007A



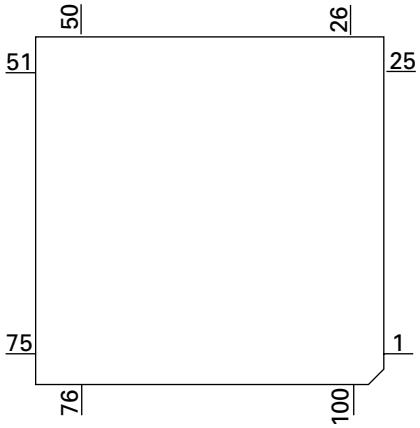

PML009A



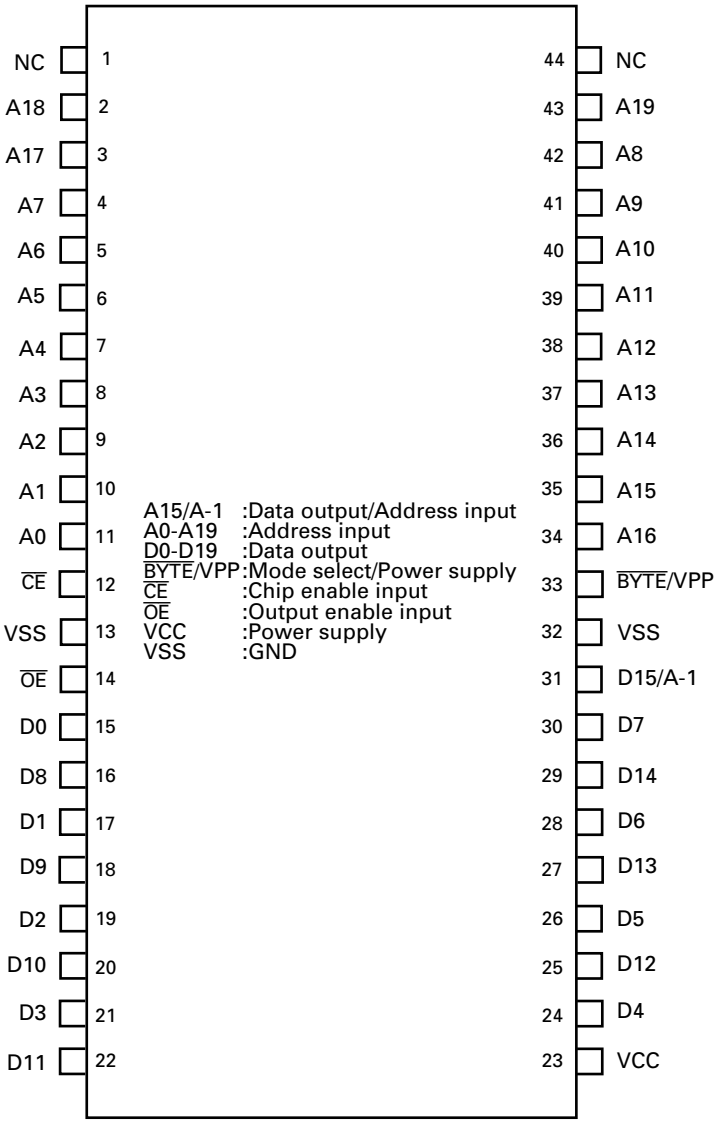
● **Pin Functions (PD5706A)**

| Pin No. | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1-4 | NC | | Not used OPEN |
| 5 | REM | I | Remote control reception input |
| 6 | BYTE | I | GND connection |
| 7 | CNVSS | I | GND connection |
| 8, 9 | NC | | Not used OPEN |
| 10 | $\overline{\text{RESET}}$ | | Pull up |
| 11 | XOUT | O | Crystal oscillating element connection pin |
| 12 | VSS | | VSS connection |
| 13 | XIN | I | Crystal oscillating element connection pin |
| 14 | VCC | | VCC connection |
| 15 | $\overline{\text{NMI}}$ | I | NVI input (Not used) |
| 16-19 | $\overline{\text{KD1}}$-$\overline{\text{KD2}}$ | I | Key data 1-4 input |
| 20 | CKC | O | Fixed pulse output for cathode driver |
| 21 | NC | | Not used |
| 22 | CKA | O | Fixed pulse output for anode driver |
| 23 | NC | | Not used |
| 24 | LS | O | Line sink signal output |
| 25 | NC | | Not used |
| 26 | CKD | O | Data transport / driver clock output |
| 27 | DPDT | I | Display data input |
| 28 | KYDT | O | Key data output |
| 29 | DA2 | O | Display data MSB output |
| 30 | NC | | Not used |
| 31 | CLK1 | I | Clock input for UART1 |
| 32 | ILMD | O | Dual illumination select output |
| 33 | DA1 | O | Display data LSB output |
| 34 | NC | | Not used |
| 35 | CLK0 | I | Clock input for UART0 input |
| 36 | NC | | Not used |
| 37 | $\overline{\text{RDY}}$ | I | Not used |
| 38 | NC | | Not used |
| 39 | $\overline{\text{HOLD}}$ | I | Not used |
| 40,41 | NC | | Not used |
| 42 | $\overline{\text{RD}}$ | O | Read strobe output |
| 43-46 | NC | | Not used |
| 47 | $\overline{\text{CS1}}$ | O | Bank address select output |
| 48 | $\overline{\text{CS0}}$ | O | External ROM chip select output |
| 49 | A19 | O | Address bus 19 output |
| 50 | A18 | O | Address bus 18 output (Not used) |
| 51-59 | A17-A9 | O | Address bus 17-9 output |
| 60 | VCC | | VCC connection |
| 61 | A8 | O | Address bus 8 output |
| 62 | VSS | | GND connection |
| 63-69 | A7-A1 | O | Address bus 7-1 output |
| 70 | A0 | O | Address bus 0 output (Not used) |
| 71-86 | D15-D0 | I/O | Data bus 15-0 input / output |
| 87-92 | $\overline{\text{KS1}}$-$\overline{\text{KS6}}$ | I/O | Key strobe input / output |
| 93 | NC | | Not used |
| 94 | AVSS | | GND connection |
| 95 | NC | | Not used OPEN |
| 96 | VREF | | Not used VSS connection |
| 97 | AVCC | | Not used VCC connection |
| 98-100 | NC | | Not used OPEN |

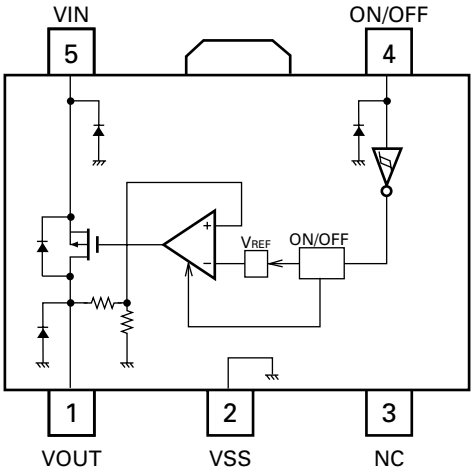
*PD5706A



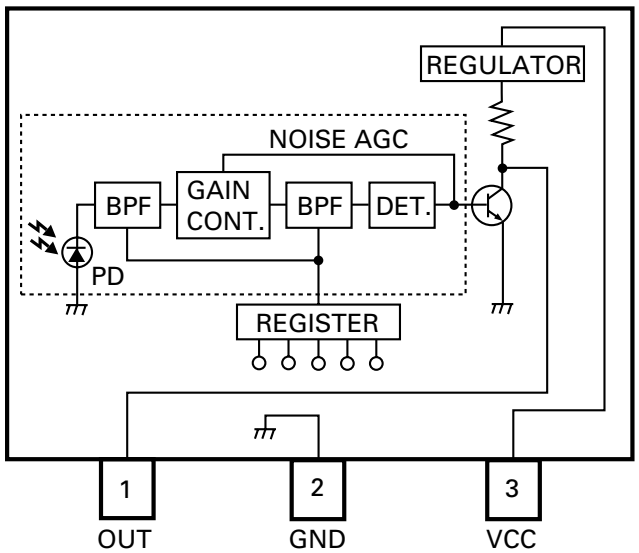

*PD8088A



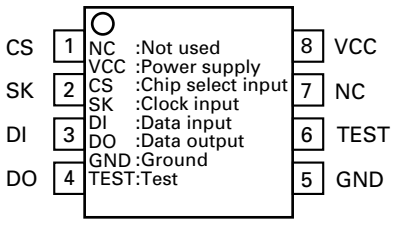

*S-818A33AUC-BGN




*TSOP1840SB3V




*PDH0044A

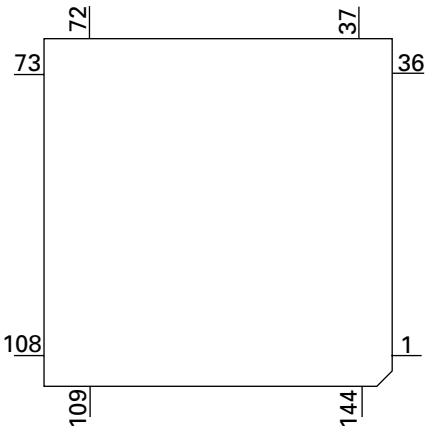


● **Pin Functions (UPD63760GJ)**

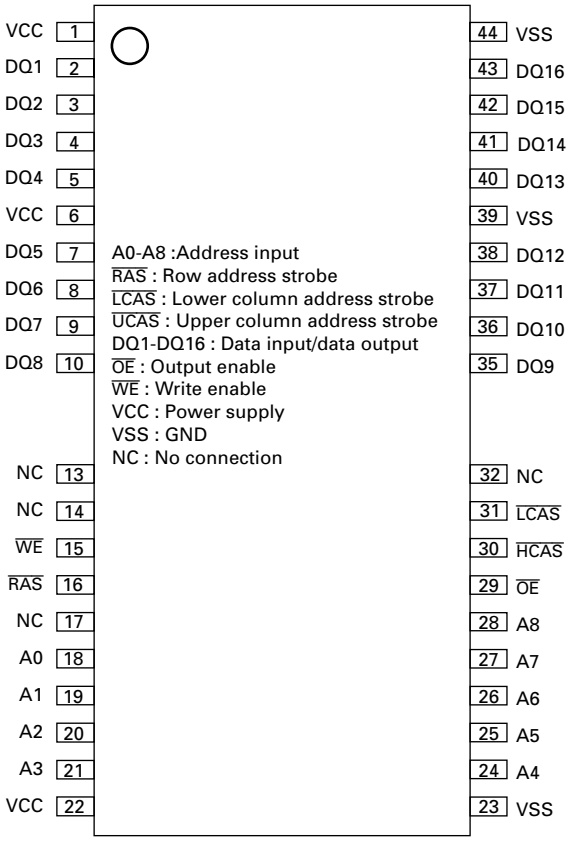
| Pin No. | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 1 | R.GND | | GND for DRAM I/F |
| 2 | $\overline{\text{RST}}$ | I | Input of reset |
| 3-7 | AB12-8 | I | Address bus 12-8 from the microcomputer |
| 8-15 | AD7-0 | I/O | Address/data bus 7-0 to the microcomputer |
| 16 | $\overline{\text{CS}}$ | I | Chip selection |
| 17 | ASTB | I | Address strobe |
| 18 | $\overline{\text{READ}}$ | I | Control signals (read) |
| 19 | $\overline{\text{WRITE}}$ | I | Control signals (write) |
| 20 | $\overline{\text{WAIT}}$ | O | Control signals (wait) |
| 21 | INTQ | | Interruption signals to the external microcomputer |
| 22 | IFMODE | I | Switching between the data buses (16bit/8bit) |
| 23 | D.VDD | | Power supply for digital circuits |
| 24 | $\overline{\text{XTALEN1}}$ | I | Permission to oscillate 16.9344MHz |
| 25 | $\overline{\text{XTALEN2}}$ | I | Permission to oscillate 24.576MHz |
| 26 | DA.VDD | | Power supply for DAC |
| 27 | ROUT | O | Output of audio for the right channel |
| 28 | DA.GND | | GND for DAC |
| 29 | R+ | O | Output of the right channel audio PWM |
| 30 | R- | O | Output of the right channel audio PWM |
| 31 | REGC | | Connected to the capacitor for band gap |
| 32 | L- | O | Output of the left channel audio PWM |
| 33 | L+ | O | Output of the left channel audio PWM |
| 34 | DA.GND | | GND for DAC |
| 35 | LOUT | O | Output of audio for the left channel |
| 36 | DA.VDD | | Power supply for DAC |
| 37 | X.VDD | | Power supply for the crystal oscillator |
| 38 | XTAL1 | | Connected to the crystal oscillator (16.9344MHz) |
| 39 | $\overline{\text{XTAL1}}$ | | Connected to the crystal oscillator (16.9344MHz) |
| 40, 41 | X.GND | | Ground for the crystal oscillator |
| 42 | $\overline{\text{XTAL2}}$ | | Connected to the crystal oscillator (24.576MHz) |
| 43 | XTAL2 | | Connected to the crystal oscillator (24.576MHz) |
| 44 | X.VDD | | Power supply for the crystal oscillator |
| 45 | D.GND | | GND for digital circuits |
| 46 | DIN | I | Input of audio data |
| 47 | DOUT | O | Output of audio data |
| 48 | SCKIN | I | Clock input for audio data |
| 49 | SCKO | O | Clock output for audio data |
| 50 | LRCKIN | I | Input of LRCK for audio data |
| 51 | LRCK | O | Output LRCK for audio data |
| 52 | TESTX | O | Output for tests |
| 53 | RFOK | O | Output of RFOK |
| 54 | C16M | O | Output of 16.9344MHz |
| 55 | TESTEN | I | Connected to GND |
| 56 | TEST4 | I | Connected to GND |
| 57 | D.VDD | | Power supply for digital circuits |
| 58 | RFCK/HOLD | O | Output of RFCK/HOLD signal |
| 59 | WFCK/MIRR | O | Output of WFCK/MIRR signal |
| 60 | PLCK | O | Output of PLCK |
| 61 | LOCK | O | Output of LOCK |
| 62 | C1D1 | O | Information on error correction |
| 63 | C1D2 | O | Information on error correction |
| 64 | C2D1(RMUTE) | O | Information on error correction (mute for Rch) |
| 65 | C2D2(LMUTE) | O | Information on error correction (mute for Lch) |
| 66 | C2D3 | O | Information on error correction |
| 67 | D.GND | | Ground for digital circuits |
| 68 | $\overline{\text{RAS}}$ | O | Output of DRAM RAS |

| Pin No. | Pin Name | I/O | Function and Operation |
|---|---|---|---|
| 69 | $\overline{CAS0}$ | O | Output of DRAM Lower CAS |
| 70 | $\overline{CAS1}$ | O | Output of DRAM Upper CAS |
| 71 | $\overline{WE}$ | O | Output of DRAM WE |
| 72 | $\overline{OE}$ | O | Output of DRAM OE |
| 73-88 | RDB0-15 | I/O | Input/output of DRAM Data0-15 |
| 89 | D.GND | | Ground for digital circuits |
| 90-99 | RA0-9 | O | Output of DRAM Address0-9 |
| 100 | D.VDD | | Power supply for digital circuits |
| 101-104 | TEST0-3 | I | Connected to GND |
| 105 | FD | O | Output of focus drive PWM |
| 106 | TD | O | Output of tracking drive PWM |
| 107 | SD | O | Output of thread drive PWM |
| 108 | MD | O | Output of spindle drive PWM |
| 109 | A.VDD | | Power supply for the analog system |
| 110 | ATEST | O | Analog tests |
| 111 | EFM | O | Output of EFM signals |
| 112 | ASY | I | Input of asymmetry |
| 113 | C3T | | Connection to the capacitor for detecting 3T |
| 114 | A.GND | | Ground for the analog system |
| 115 | RFI | I | Input of RF |
| 116 | AGCO | O | Output of RF |
| 117 | AGCI | I | Input of AGC |
| 118 | RFO | O | Output of RF(AGC) |
| 119, 120 | EQ2, 1 | | Equalizer 2, 1 |
| 121 | RF2- | I | Reversal input of RF2 |
| 122 | RF- | I | Reversal input of RF |
| 123 | A.GND | | Ground for the analog system |
| 124 | A | I | Input of A |
| 125 | C | I | Input of C |
| 126 | B | I | Input of B |
| 127 | D | I | Input of D |
| 128 | F | I | Input of F |
| 129 | E | I | Input of E |
| 130 | A.VDD | | Power supply for the analog system |
| 131 | REFOUT | O | Output of reference voltage |
| 132 | REFC | | Connected to the capacitor for output of REFOUT |
| 133 | FE- | I | Reversal input of FE |
| 134 | FEO | O | Output of FE |
| 135 | TE- | I | Reversal input of TE |
| 136 | TEO | O | Output of TE |
| 137 | TE2 | O | TE2 |
| 138 | TEC | I | TEC |
| 139 | A.GND | | Ground for the analog system |
| 140 | LDREGO | O | Output of REG voltage for APC |
| 141 | PD | I | Input of PD |
| 142 | LD | O | Output of LD |
| 143 | PN | I | Assignment of pickup polarity |
| 144 | A.VDD | | Power supply for the analog system |

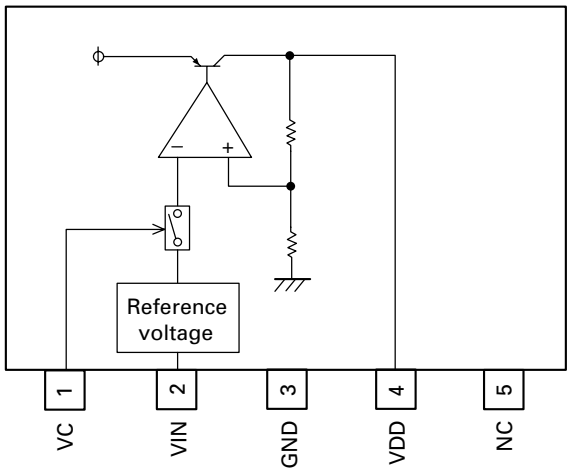
*UPD63760GJ




*MSM51V4265EP-70TS




BA033SFP



● **Pin Functions(BA5996FM)**

| Pin No. | Pin Name | Function and Operation |
|---|---|---|
| 1 | VR | Input pin for reference voltage |
| 2 | OPIN2(+) | Input pin for non-inverting input for CH2 preamplifier |
| 3 | OPIN2(-) | Input pin for inverting input for CH2 preamplifier |
| 4 | OPOUT2 | Output pin for CH2 preamplifier |
| 5 | OPIN1(+) | Input pin for non-inverting input for CH1 preamplifier |
| 6 | OPIN1(-) | Input pin for inverting input from CH1 preamplifier |
| 7 | OPOUT1 | Output pin for CH1 preamplifier |
| 8 | GND | Ground pin |
| 9 | MUTE | Mute control pin |
| 10 | POWVCC1 | Power supply pin for CH1, CH2, and CH3 at "Power" stage |
| 11 | VO1(-) | Driver CH1 - Negative output |
| 12 | VO1(+) | Driver CH2 - Positive output |
| 13 | VO2(-) | Driver CH2 - Negative output |
| 14 | VO2(+) | Driver CH2 - Positive output |
| 15 | VO3(+) | Driver CH2 - Positive output |
| 16 | VO3(-) | Driver CH2 - Negative output |
| 17 | VO4(+) | Driver CH4 - Positive output |
| 18 | VO4(-) | Driver CH4 - Negative output |
| 19 | POWVCC2 | Power supply pin for CH4 at "Power" stage |
| 20 | GND | Ground pin |
| 21 | CNT | Control pin |
| 22 | LDIN | Loading input |
| 23 | OPOUTSL | Output pin for preamplifier for thread |
| 24 | OPINSL | Input pin for preamplifier for thread |
| 25 | OPOUT3 | CH3 preamplifier output pin |
| 26 | OPIN3(-) | Input pin for inverting input for CH3 preamplifier |
| 27 | OPIN3(+) | Input pin for non-inverting input for CH3 preamplifier |
| 28 | PREVCC | PreVcc |

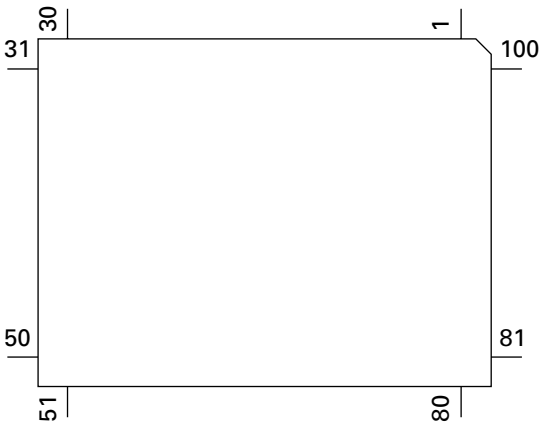
BA5996FM

● **Pin Functions (PE5268A)**

| Pin No. | Pin Name | I/O | Format | Function and Operation |
|---|---|---|---|---|
| 1 | FTXD | O | C | For rewriting Flash EP-ROM (sending signals) |
| 2 | NC | | | Open |
| 3 | BSI | I | | Input of P-Bus serial data |
| 4 | BSO | O | C | Output of P-Bus serial data |
| 5 | $\overline{\text{BSCK}}$ | I/O | /C | Input/output of P-Bus serial clock |
| 6, 7 | DFS1, 2 | O | C | Output 1, 2 of settings of DA I/F IC sampling frequency |
| 8 | DCKS | O | C | Output for selection of DA I/F IC clock subharmonic number |
| 9 | EVDD | | | Positive power supply for E power |
| 10 | EVSS | | | Potential of GND of E power |
| 11 | NC | | | Open |
| 12 | DCOPY | O | C | Output of settings of DA I/F IC copy flag |
| 13 | $\overline{\text{CRST}}$ | O | C | Output of reset control of Compression IC |
| 14-16 | CBANK0-2 | O | C | Output 0-2 of bank settings of Compression IC |
| 17 | $\overline{\text{EMPH}}$ | O | C | Output of information on emphasis |
| 18 | DSPMUTE | O | C | Output of DOUT Mute |
| 19 | DSET | O | C | Output for lighting the disc set indicator |
| 20 | $\overline{\text{ADENA}}$ | O | C | Output of control of A/D reference voltage supply |
| 21 | IC/VPP | | | IC: connected directly to VSS / VPP: Pull-down |
| 22 | BRXEN | I/O | /C | P-Bus receiving enabled |
| 23 | $\overline{\text{BSRQ}}$ | I/O | /C | Request for P-Bus service request |
| 24 | $\overline{\text{XTALEN1}}$ | O | C | Output of permission to oscillate CD LSI 16.9344MHz |
| 25 | $\overline{\text{XTALEN2}}$ | O | C | Output of permission to oscillate CD LSI 24.576MHz |
| 26 | $\overline{\text{XRST}}$ | O | C | Output of control of CD LSI reset |
| 27 | VDCONT | O | C | Output of control of VD power supply |
| 28 | CD3VON | O | C | Output of control of CD +3.3V power supply |
| 29 | CONT | O | C | Output of control of power supply to servo driver |
| 30 | $\overline{\text{XWAIT}}$ | I | | Input of control signals of CD LSI wait |
| 31 | LOEJ | O | C | Output for switching between LOAD/EJECT directions |
| 32 | CLCONT | O | C | Output for switching between driver inputs |
| 33 | CDMUTE | O | C | Output of control of CD Mute |
| 34 | $\overline{\text{RESET}}$ | I | | Input of system reset |
| 35 | XT1 | I | | Connected to the oscillator for subclock (connected to VSS via the resistor) |
| 36 | XT2 | | | Connected to the oscillator for subclock (Open) |
| 37 | REGC | | | Connected to the capacity stabilizing output of the regulator (an electrolytic capacitor of about 1µF) |
| 38 | X2 | | | Connected to the oscillator for the main clock |
| 39 | X1 | I | | Connected to the oscillator for the main clock |
| 40 | VSS | | | Potential of GND |
| 41 | VDD | | | Positive power supply (5V) |
| 42 | CLKOUT | O | C | Output of internal system clock (Open) |
| 43 | $\overline{\text{XWRITE}}$ | O | | Output of control signals of CD LSI light |
| 44 | $\overline{\text{UBEN}}$ | O | | Not used (Open) |
| 45 | WR/W | O | | Output of Read/Write control signals of WMA decoder |
| 46 | $\overline{\text{XREAD}}$ | O | | Output of read control signals of CD LSI |
| 47 | XASTB | O | | Output of CD LSI address strobe |
| 48 | LOCK | I | | Input of spindle lock |
| 49 | $\overline{\text{WRST}}$ | O | C | Output for reset control of WMA decoder |
| 50-57 | AD0-7 | I/O | /C | Address/Data Bus 0-7 |
| 58 | BVDD | | | B power supply, positive supply (3.3V) |
| 59 | BVSS | | | B power supply, potential of GND |
| 60-67 | AD8-15 | I/O | /C | Address/Data Bus 8-15 |
| 68 | $\overline{\text{XCS}}$ | O | C | Output for chip selection of CD LSI |
| 69 | $\overline{\text{WCS}}$ | O | C | Output for chip selection of WMA decoder |
| 70, 71 | DBBWRDY0, 1 | I | | Input of write-ready flag with WMA decoder DBBI0, 1 |
| 72, 73 | DBBRRDY0, 1 | I | | Input of read-ready flag with WMA decoder DBBO0, 1 |
| 74 | AVDD | | | A power supply, positive supply (5V) |
| 75 | AVSS | | | A power supply, potential of GND |

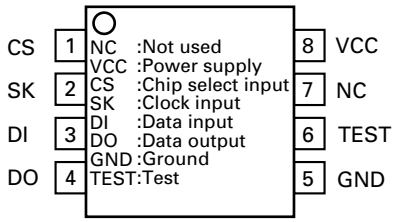
| Pin No. | Pin Name | I/O | Format | Function and Operation |
|---|---|---|---|---|
| 76 | AVREF | | | Input of reference voltage for A/D converter |
| 77 | VDSENS | | | Input of sensing short of VD power supply |
| 78 | DSCSNS | | | Input of sensing disc status |
| 79 | TEMP | | | Input of sensing information on temperature |
| 80 | HOME | I | | Input of sensing Home SW |
| 81 | $\overline{\text{CSENS}}$ | I | | Input of sensing the flap closed |
| 82-85 | NC | | | Connected to AVDD or AVSS via the resistor |
| 86 | WMAARI | I | | Input of sensing existence of WMA decoder & DA I/F IC |
| 87 | DRAMARI | I | | Input of sensing existence of external DRAM for CD LSI |
| 88 | $\overline{\text{TESTIN}}$ | I | | Input with starting test program for checking chips |
| 89 | NC | | | Connected to EVDD or EVSS via the resistor |
| 90 | $\overline{\text{XINT}}$ | | | Input of interruption signals of CD LSI |
| 91 | $\overline{\text{WINT}}$ | | | Input of interruption signals of WMA decoder |
| 92 | $\overline{\text{BRST}}$ | I | | Input of reset of P-Bus |
| 93 | $\overline{\text{EJSW}}$ | I | | Input of Eject key |
| 94-96 | NC | | | Open |
| 97 | ROMDATA | I/O | /C | Input/output of E2PROM data |
| 98 | ROMCS | O | C | Output for chip selection of E2PROM |
| 99 | ROMCK | O | C | Output of clock of E2PROM |
| 100 | FRXD | I | | For rewriting Flash EP-ROM (receiving signals) |

*PE5268A

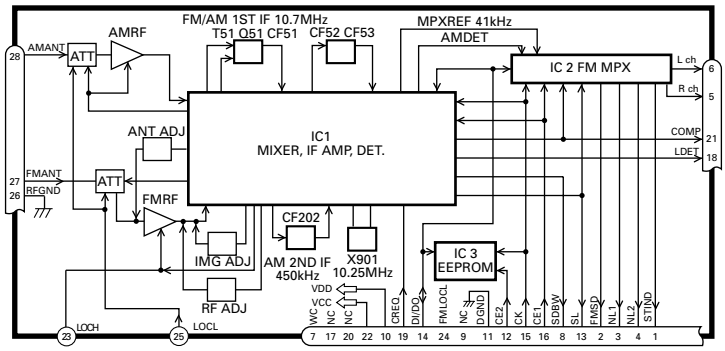



| Format | Meaning |
|---|---|
| C | C MOS |

*PDH043A

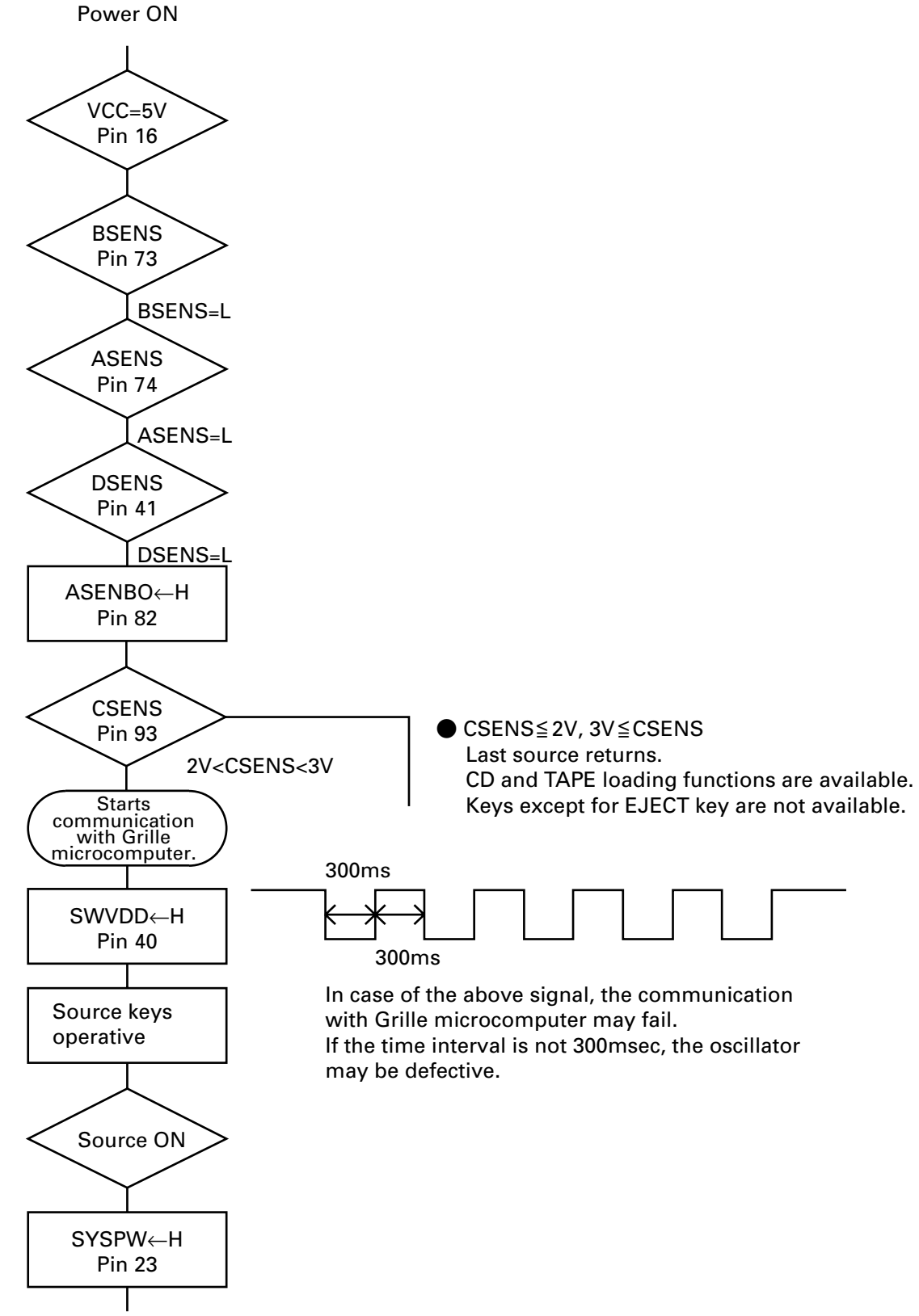


## ● FM/AM Tuner Unit




| No. | Symbol | I/O | Explain | |
|---|---|---|---|---|
| 1 | STIND | O | stereo indicator | "Low" when the FM stereo signals are received. To be pulled up to the "VDD" at 47kΩ. |
| 2 | FMSD | O | FM station detector | "High" when signals are received. To be pulled up to the "VDD" at 47kΩ Meanwhile, 10kΩ should be used when taking diver FIX trigger from here and "High: 0.9VDD or more" and "Low: 250mV or less". (Should satisfy the diver IC specifications) |
| 3 | NL1 | O | noise level-1 | "High" when noise is received. Output for the RDS. GND at 47kΩ //1,800pF. |
| 4 | NL2 | O | noise level-2 | "High" when noise is received. Output for the RDS. GND at 36kΩ //330pF. |
| 5 | Rch | O | R channel output | FM stereo "R-ch" signal output or AM audio output. Add the specified de-emphasis constant. |
| 6 | Lch | O | L channel output | FM stereo "L-ch" signal output or AM audio output. Add the specified de-emphasis constant. |
| 7 | WC | | write control | EEPROM write control. Writing permissible at "Low". Normally open. |
| 8 | SDBW | O | SD bandwidth | SD bandwidth signal output. For detection of detuning data for the RDS. |
| 9 | NC | | | Not used |
| 10 | VDD | | power supply | Power supply pin for the digital section. DC 5V +/- 0.25V. Be careful about overlapping noise in the logic section. |
| 11 | DGND | | digital ground | Grounding for the digital section. |
| 12 | CE2 | I | chip enable-2 | EEPROM chip enable. Active a "Low" To be pulled up to the "VDD" at 47kΩ |
| 13 | SL | I/O | signal level | Received FM/AM signal level (strength) output. Connect the specified load resistor and capacitor (10k Ω + 39k Ω //4,700pF) |
| 14 | DI/DO | I/O | data input/ data output | Data input/Data output To be pulled up to the "VDD" at 47kΩ |
| 15 | CK | I | clock | Clock input To be pulled up to the "VDD" at 47kΩ |
| 16 | CE1 | I | chip enable-1 | AF·RF chip enable. Active at "High" To be grounded at 47kΩ |
| 17 | NC | | | Not used |
| 18 | LDET | O | lock detector | Active at "Low". To be pulled up to the "VDD" at 47kΩ |
| 19 | CREQ | I | current request | Active at "Low". To be grounded at 47kΩ |
| 20 | NC | | | Not used |
| 21 | COMP | O | composite signal | FM composite signal output. r out < 100Ω |
| 22 | VCC | | power supply | Analog section power supply pin.DC 8.4V +/- 0.3V |
| 23 | LOCH | I | local high | FM local high pin. When seeking local high, apply 5V together with "LOCL". |
| 24 | FMLOCL | I | FM local low | FM local low pin. When seeking local low, apply 5V to the base of the NPN transistor with which the specified resistor is being connected to the emitter. Keep it open in case of ordinary marketed models. |
| 25 | LOCL | I | local low | FM/AM local low pin. When seeking local low, apply 5V to the base of the NPN transistor. Since this pin is exclusive for AM when the FMLOCL is in use, do not drive it under FM. |
| 26 | RFGND | | RF ground | Grounding for the antenna section. |
| 27 | FMANT | I | FM antenna input | FM antenna input. 75Ω. Surge absorber (DSP-201M-S00B) is necessary. |
| 28 | AMANT | I | AM antenna input | AM antenna input. High impedance. Connect to the antenna through an L (LAU type) of 4.7μH.To cope with the power transmission line hums, insert a series circuit consisting of an L (a coil of about 100mH) + R (a resistor of 470 Ω to 2.2kΩ) between the GND. |

## 7.3 OPERATIONAL FLOW CHART




Completes power-on operation.
(After that, proceed to each source operation)

## 7.4 CLEANING

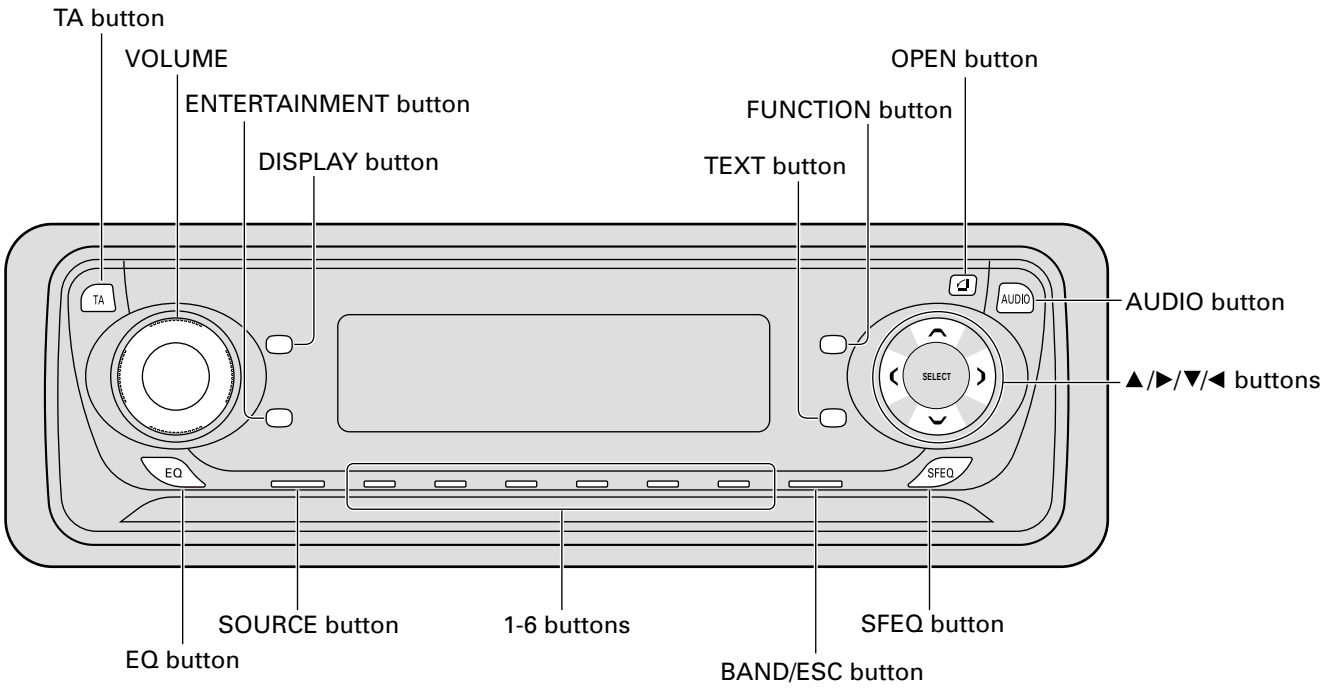
Before shipping out the product, be sure to clean the following portions by using the prescribed cleaning tools:

| Portions to be cleaned | Cleaning tools |
|---|---|
| CD pickup lenses | Cleaning liquid : GEM1004<br>Cleaning paper : GED-008 |

# 8. OPERATIONS AND SPECIFICATIONS

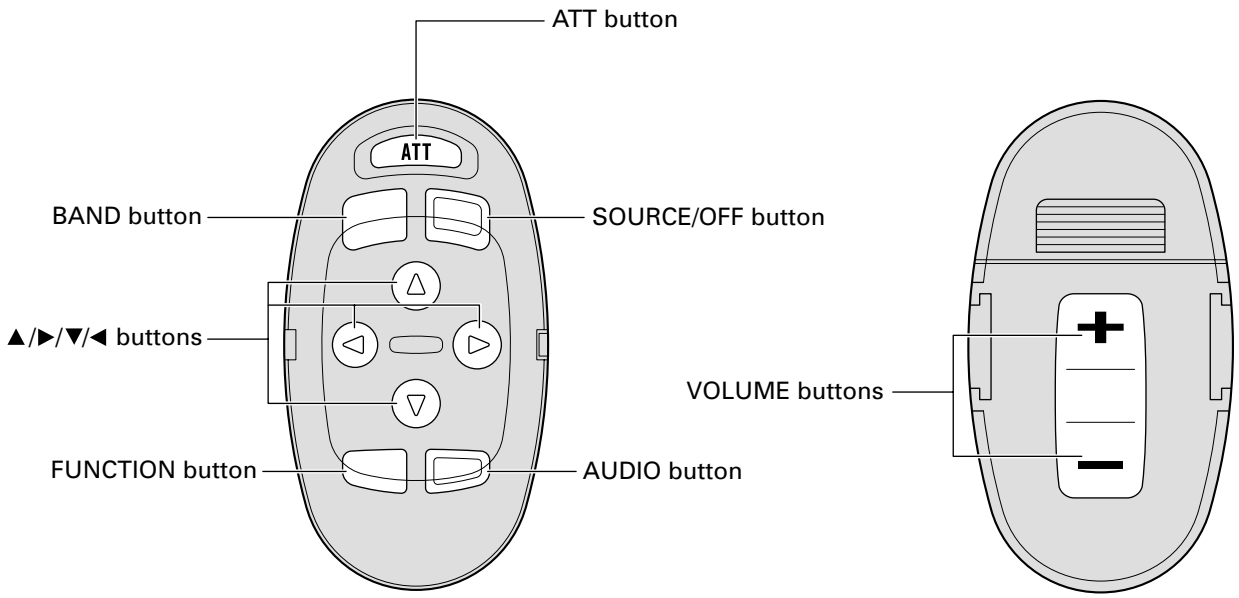
## 8.1 OPERATIONS

**HEAD UNIT**

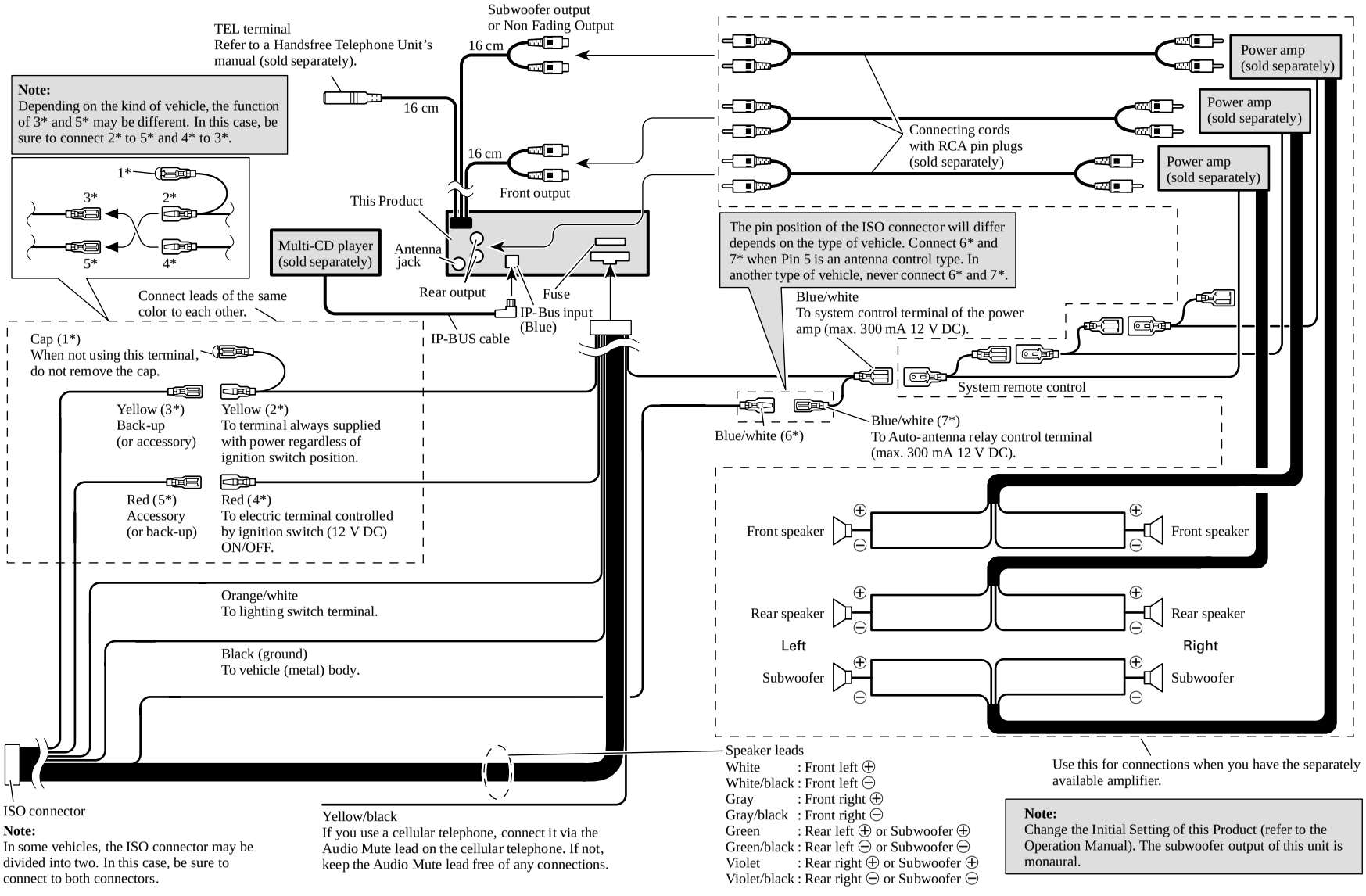



**STEERING REMOTE CONTROL UNIT (CD-SR80)**

The steering remote control CD-SR80 is sold separately. Operation is the same as when using the button on the head unit.



## ● CONNECTION DIAGRAM


TEL terminal
Refer to a Handsfree Telephone Unit's manual (sold separately).
Subwoofer output or Non Fading Output
16 cm
16 cm
16 cm
Front output
Note:
Depending on the kind of vehicle, the function of 3* and 5* may be different. In this case, be sure to connect 2* to 5* and 4* to 3*.
1*
2*
3*
4*
5*
This Product
Multi-CD player (sold separately)
Antenna jack
Rear output
Fuse
IP-Bus input (Blue)
IP-BUS cable
Connect leads of the same color to each other.
Power amp (sold separately)
Power amp (sold separately)
Power amp (sold separately)
Connecting cords with RCA pin plugs (sold separately)
The pin position of the ISO connector will differ depends on the type of vehicle. Connect 6* and 7* when Pin 5 is an antenna control type. In another type of vehicle, never connect 6* and 7*.
Blue/white
To system control terminal of the power amp (max. 300 mA 12 V DC).
System remote control
Blue/white (6*)
Blue/white (7*)
To Auto-antenna relay control terminal (max. 300 mA 12 V DC).
Cap (1*)
When not using this terminal, do not remove the cap.
Yellow (3*)
Back-up
(or accessory)
Yellow (2*)
To terminal always supplied with power regardless of ignition switch position.
Red (5*)
Accessory
(or back-up)
Red (4*)
To electric terminal controlled by ignition switch (12 V DC) ON/OFF.
Orange/white
To lighting switch terminal.
Black (ground)
To vehicle (metal) body.
Front speaker
Front speaker
Rear speaker
Rear speaker
Left
Right
Subwoofer
Subwoofer
ISO connector
Note:
In some vehicles, the ISO connector may be divided into two. In this case, be sure to connect to both connectors.
Yellow/black
If you use a cellular telephone, connect it via the Audio Mute lead on the cellular telephone. If not, keep the Audio Mute lead free of any connections.
Speaker leads
White : Front left ⊕
White/black : Front left ⊖
Gray : Front right ⊕
Gray/black : Front right ⊖
Green : Rear left ⊕ or Subwoofer ⊕
Green/black : Rear left ⊖ or Subwoofer ⊖
Violet : Rear right ⊕ or Subwoofer ⊕
Violet/black : Rear right ⊖ or Subwoofer ⊖
Use this for connections when you have the separately available amplifier.
Note:
Change the Initial Setting of this Product (refer to the Operation Manual). The subwoofer output of this unit is monaural.

## 8.2 SPECIFICATIONS

### General

Power source ..... 14.4 V DC
(10.8 – 15.1 V allowable)
Grounding system ..... Negative type
Max. current consumption
..... 10.0 A
Backup current ..... 5 mA or less
Dimensions (W x H x D):
Chassis (DIN) ..... 178 x 50 x 157 mm
Nose ..... 188 x 58 x 19 mm
Weight ..... 1.6 kg

### Audio

Maximum power output 50 W x 4
for subwoofer (70 W x 1 ch/2 Ω)
25 W x 4 (BRI)
Continuous power output 27 W x 4
(DIN 45324, +B=14.4 V)
Load impedance ..... 4 Ω (4 – 8 Ω [2 Ω for 1 ch] allowable)
Preout max output level/output impedance
..... 2.2 V/1 kΩ
Equalizer (3-Band Parametric Equalizer):
(Low)
Frequency ..... 40/80/100/160 Hz
Q Factor ..... 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain ..... ±12 dB
(Mid)
Frequency ..... 200/500/1 k/2 k Hz
Q Factor ..... 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain ..... ±12 dB
(High)
Frequency ..... 3.15 k/8 k/10 k/12.5 k Hz
Q Factor ..... 0.35/0.59/0.95/1.15
(+6 dB when boosted)
Gain ..... ±12 dB
Loudness contour:
(Low) ..... +3.5 dB (100 Hz)
+3 dB (10 kHz)
(Mid) ..... +10 dB (100 Hz)
+6.5 dB (10 kHz)
(High) ..... +11 dB (100 Hz)
+11 dB (10 kHz)
(Volume: –30 dB)
Tone controls:
(Bass)
Frequency ..... 40/63/100/160 Hz
Gain ..... ±12 dB
(Treble)
Frequency ..... 2.5 k/4 k/6.3 k/10 k Hz
Gain ..... ±12 dB
HPF:
Frequency ..... 50/80/125 Hz
Slope ..... –12 dB/oct
Subwoofer:
Frequency ..... 50/80/125 Hz
Slope ..... –18 dB/oct
Gain ..... ±12 dB
Phase ..... Normal/Reverse

### CD player

System ..... Compact disc audio system
Usable discs ..... Compact disc
Signal format:
Sampling frequency 44.1 kHz
Number of quantization bits
..... 16; linear
Frequency characteristics
..... 5 – 20,000 Hz (±1 dB)
Signal-to-noise ratio . 94 dB (1 kHz)
(IEC-A network)
Dynamic range ..... 92 dB (1 kHz)
Number of channels .. 2 (stereo)
MP3 decoding format MPEG-1&2 Audio Layer-3

### FM tuner

Frequency range ..... 87.5 – 108.0 MHz
Usable sensitivity ..... 9 dBf (0.8 μV/75 Ω, mono, S/N: 30 dB)
50 dB quieting sensitivity 15 dBf (1.5 μV/75 Ω, mono)
Signal-to-noise ratio . 70 dB (IEC-A network)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response .. 30 – 15,000 Hz (±3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

### MW tuner

Frequency range ..... 531 – 1,602 kHz (9 kHz)
Usable sensitivity ..... 18 μV (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

### LW tuner

Frequency range ..... 153 – 281 kHz
Usable sensitivity ..... 30 μV (S/N: 20 dB)
Selectivity ..... 50 dB (±9 kHz)

### Note

- Specifications and the design are subject to possible modifications without notice due to improvements.

Pioneer sound.vision.soul

# Service Manual

ORDER NO.
**CRT2820**

**CD MECHANISM MODULE**

# CX-3007

- **This service manual describes the operation of the CD mechanism module incorporated in models listed in the table below.**
- **When performing repairs use this manual together with the specific manual for model under repair.**

| Model | Service Manual | CD Mechanism Module |
|---|---|---|
| DEH-P740MP/XN/UC<br>DEH-P7400MP/XN/UC<br>DEH-P7450MP/XN/ES | CRT2783 | CXK5555 |
| DEH-P7400MP/XN/EW | CRT2784 | |

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3. DISASSEMBLY .....20



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**K-ZZA. JAN. 2002 Printed in Japan**

# 1. CIRCUIT DESCRIPTIONS

Recently, most CD LSI's have included DAC, RF amplifier and other peripheral circuits, as well as the core circuit DSP. This series of mechanisms employ a multi-task LSI UPD63760GJ, which has CD-ROM decoder and MP3 decoder in addition to the CD block as shown in the Fig.1.0.1. This enables to reproduce a CD-ROM where MP3 data is recorded.

Plus, in this lineup, there are WMA supported models available where WMA decoder UPD61002GC is added.
CXK5555 --- WMA non-supported
CXK5556 and CXK5557 --- WMA supported

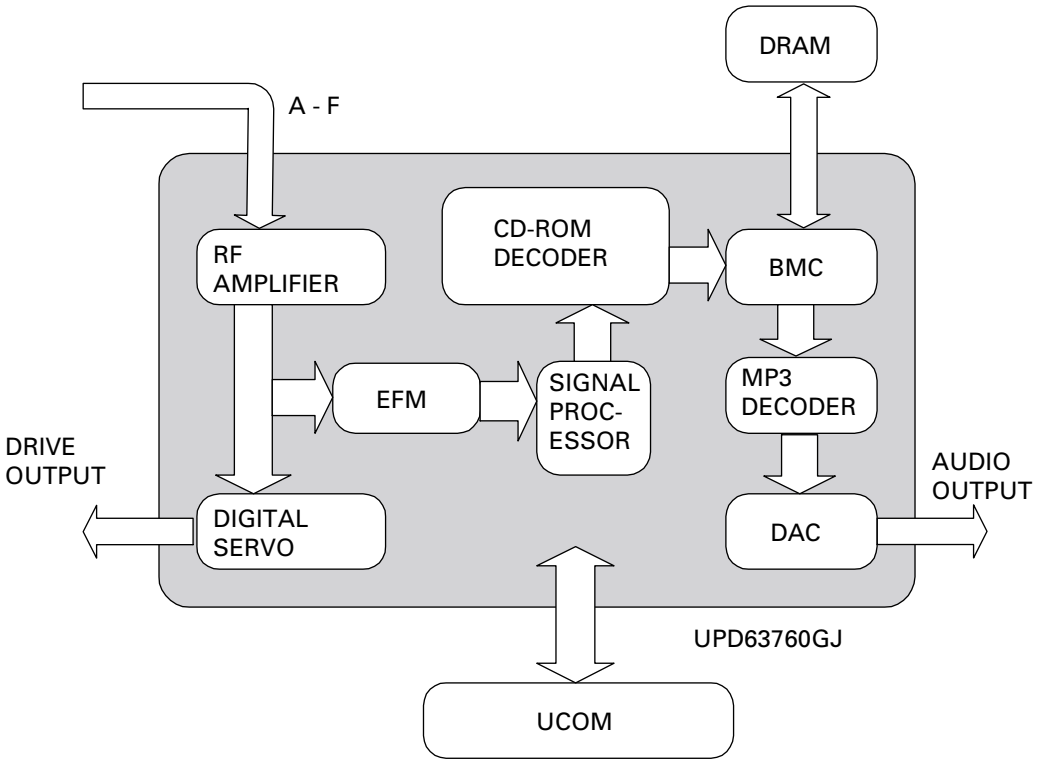



Fig.1.0.1 Block diagram of CD LSI UPD63760GJ

## 1.1 PREAMPLIFIER BLOCK (UPD63760GJ: IC201)

In the preamplifier block, the pickup output signals are processed to generate signals that are used for the next-stage blocks: the servo block, demodulator, and control.

After I/V-converted by the preamplifier with built-in photo detectors (inside the pickup), the signals are applied to the preamplifier block in the CD LSI UPD63760GJ (IC201). After added by the RF amplifier in this block, these signals are used to produce necessary signals such as RF, FE, TE, and TE zero-cross signals.

The CD LSI employs a single power supply system of + 3.3V. Therefore, the REFO (1.65V) is used as the reference voltage both for this CD LSI and the pickup. The LSI produces the REFO signal by using the REFOUT via the buffer amplifier and outputs from the pin 131. All the measurements should be made based on this REFO.

Caution: Be careful not to short the REFO and GRD when measuring.

### 1.1.1 APC (Automatic Power Control)

A laser diode has extremely negative temperature characteristics in optical output at constant-current drive. To keep the output constant, the LD current is controlled by monitor diodes. This is called the APC circuit. The LD current is calculated at about 30mA, which is the voltage between LD1 and V3R3D divided by 7.5 (ohms).

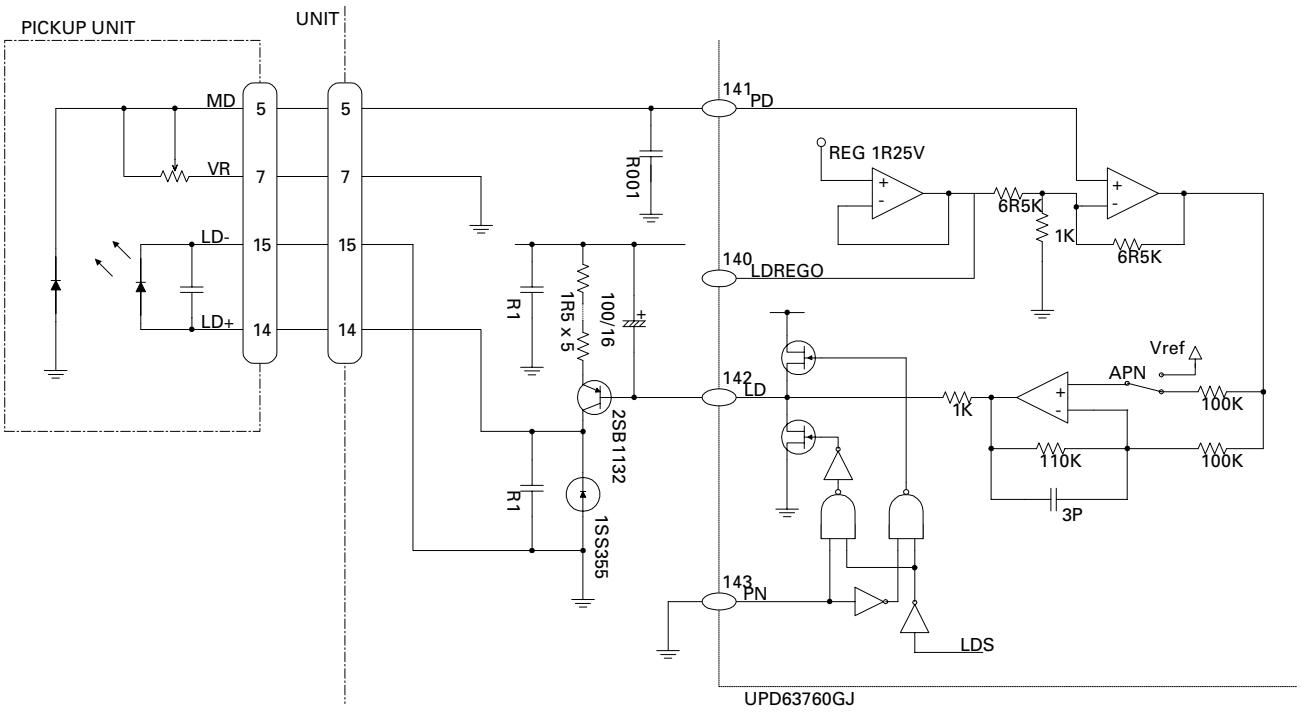



Fig. 1.1.1 APC

### 1.1.2 RF and RFAGC amplifiers

The photo-detector outputs (A + C) and (B + D) are added, amplified, and equalized inside this LSI, and then provided as the RF signal from the RFI terminal. The RF signal can be used for eye-pattern check.

The low frequency component of the RFO voltage is:

RFO = (A + B + C + D) x 2

The RFO is used for the FOK generation circuit and RF offset adjustment circuit.

The RFI output from the pin 118 is A/C-coupled outside this LSI, and returned to the pin 117 of this LSI. The signal is amplified in the RFAGC amplifier to obtain the RFAGC signal. This LSI is equipped with the RFAGC auto-adjustment function as explained below. This function automatically controls the RFO level to keep at 1.5V by switching the feedback gain for the RFAGC amplifier.

The RFO signal is also used for the EFM, DFCT, MIRR, and RFAGC auto-adjustment circuits.

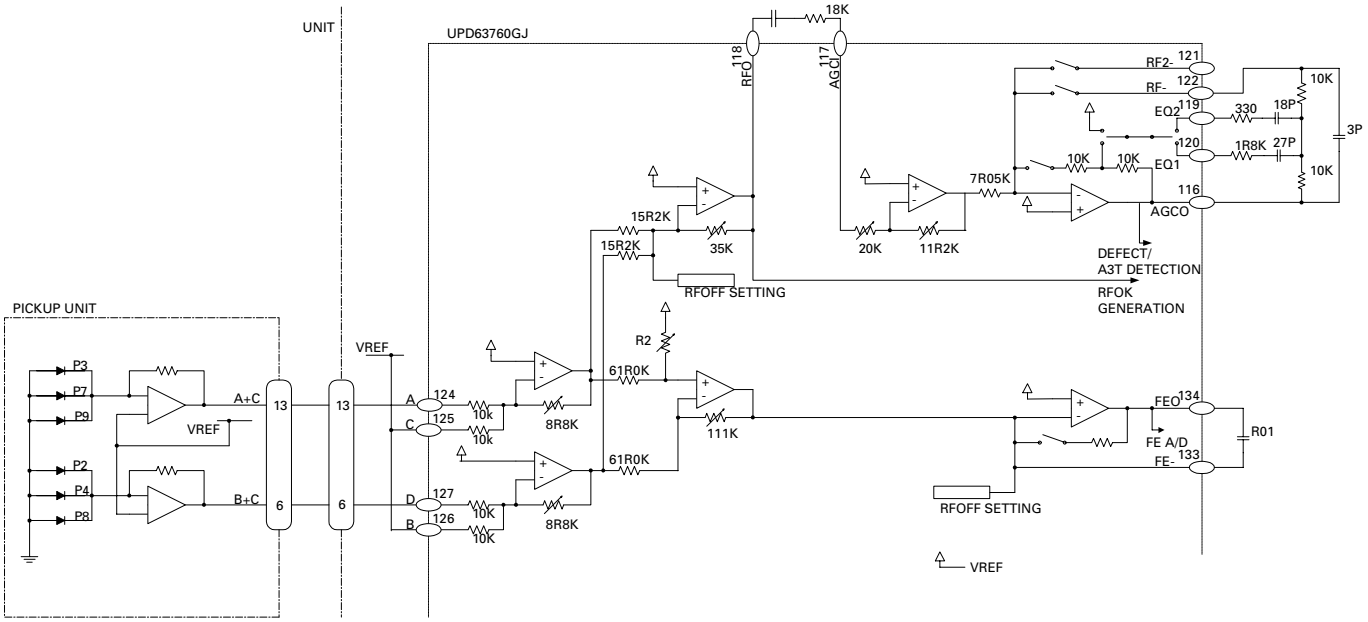



Fig. 1.1.2 RF/AGC/FE

### 1.1.3 Focus error amplifier

The photo-detector outputs (A + C) and (B + D) are applied to the differential amplifier and the error amplifier to obtain the (A + C - B - D) signal, which is then provided from the pin 91 as the FE signal.
The low frequency component of the FE voltage is:
FE = (A + C - B - D) x 8.8/10k x 111k/61k x 160k/72k
= (A + C - B - D) x 3.5
The FE output shows 1.5Vp-p S-shaped curve based on the REFO. For the next-stage amplifiers, the cutoff frequency is 14.6kHz.

### 1.1.4 RFOK

The RFOK circuit generates the RFOK signal, which indicates focus-close timing and focus-close status during the play mode, and outputs from the pin 53. This signal is shifted to "H" when the focus is closed and during the play mode.
The DC level of the RFI signal is peak-held in the digital block and compared with a certain threshold level to generate the RFOK signal. Therefore, even on a non-pit area or a mirror-surface area of a disc, the RFOK becomes "H" and the focus is closed.
This RFOK signal is also applied to the microcomputer via the low-pass filer as the FOK signal, which is used for protection and RF amplifier gain switching.

### 1.1.5 Tracking error amplifier

The photo-detector outputs E and F are applied to the differential amplifier and the error amplifier to obtain the (E - F) signal, and then provided from the pin 136 as the TE signal.
The low frequency component of the TE voltage is:
FEO = (E - F) x 160k/112k x 90.6k/45.36k x 160k/45.4k
= (E - F) x 5.7
The TE output provides the TE waveform of about 1.3Vp-p based on the REFO. For the next-stage amplifiers, the cutoff frequency is 21.1kHz.

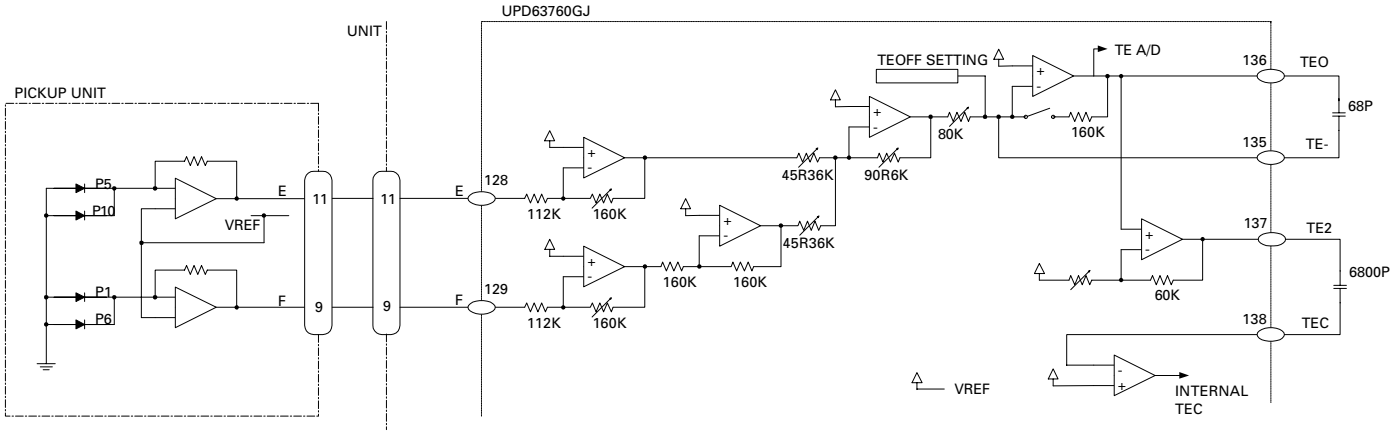



Fig. 1.1.3 TE

### 1.1.6 Tracking zero-cross amplifier

The tracking zero-cross signal (hereinafter TEC signal) is obtained by amplifying the TE signal 4 times, and used to detect the tracking-error zero-cross point.

By using the information on this point, the following two operations can be performed:

1. Track counting in the carriage move and track jump modes
2. Sensing the lens-moving direction at the moment of the tracking close (The sensing result is used for the tracking brake circuit as explained below.)

The frequency range of the TEC signal is between 300Hz and 20kHz.

TEC voltage = TE level x 4

The TEC level can be calculated at 5.2V. This level exceeds the D range of the operation amplifier, and the signal gets clipped. However, it can be ignored because the CD LSI only uses the signal at the zero-cross point.

### 1.1.7 EFM

The EFM circuit converts the RF signal into a digital signal expressed in binary digits 0 and 1. The AGCO output from the pin 116 is A/C-coupled in the peripheral circuit, fed back to the LSI from the pin 115, and sent to the EFM circuit inside the LSI.

On scratched or dirty discs, part of the RF signal recorded may be missing. On other discs, part of the RF signal recorded may be asymmetric, which was caused by dispersion in production quality. Such lack of information cannot be completely eliminated by this AC coupling process. Therefore, by utilizing the fifty-fifty occurrence ratio of binary digits (0 and 1) in the EFM signal, the EFM comparator reference voltage ASY is controlled, so that the comparator level always stays around the center of the RFO signal. The reference voltage ASY is made from the EFM comparator output via the low-pass filter. The EFM signal is put out from the pin 111.

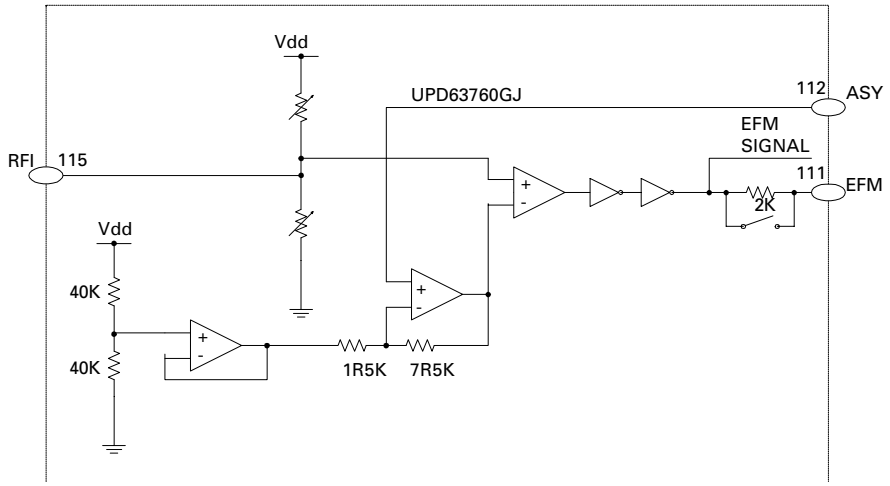



Fig. 1.1.4 EFM

## 1.2 SERVO BLOCK (UPD63760GJ: IC201)

The servo block controls the servo systems for error signal equalizing, in-focus, track jump and carriage move and so on. The DSP block is a signal-processing block, where data decoding, error correction, and compensation are performed.

After A/D-converted, the FE and TE signals (generated in the preamplifier block) are applied to the servo block and used to generate the drive signals for the focus, tracking, and carriage servos.

The EFM signal is decoded in the DSP block, and finally sent out as the audio signal after D/A-converted. In this decoding process, the spindle servo error signal is generated, supplied to the spindle servo block, and used to generate the spindle drive signal.

The drive signals for focus, tracking, carriage, and spindle servos (FD, TD, SD, and MD) are provided as PWM3 data, and then converted to the analog data by the low-pass filter in the driver IC BA5996FM (IC301). These analog drive signals can be monitored by the FIN, TIN, CIN, and SIN signals respectively. Afterwards, the signals are amplified and applied to each servo's actuator and motor.

### 1.2.1 Focus servo system

In the focus servo system, the digital equalizer block works as its main equalizer. The figure 1.2.1 shows the block diagram of the focus servo system.

To close the focus loop circuit, the lens should be moved to within the in-focus range. While moving the lens up and down by using the focus search triangular signal, the system tries to find the in-focus point. In the meantime, the spindle motor rotation is kept at the prescribed one by using the kick mode.

The servo LSI monitors the FE and RFOK signals and automatically performs the focus close operations at an appropriate timing. The focus loop will close when the following three conditions are satisfied at the same time:

1) The lens moves toward the disc surface.

2) The RFOK signal is shifted to "H".

3) The FE signal is zero-crossed. At last, the FE signal comes to the zero level (or REFO).

When the focus loop is closed, the FSS bit is shifted from "H" to "L". The microcomputer starts monitoring the RFOK signal obtained through the low-pass filter 10msec after that.

If the RFOK signal is detected as "L", the microcomputer will take several actions including protection.

The timing chart for focus close operations is shown in fig. 1.2.2. (This shows the case where the system fails focus close.)

In the test mode, the S-shaped curve, search voltage, and actual lens movement can be confirmed by pressing the focus close button when the focus mode selector displays 01.

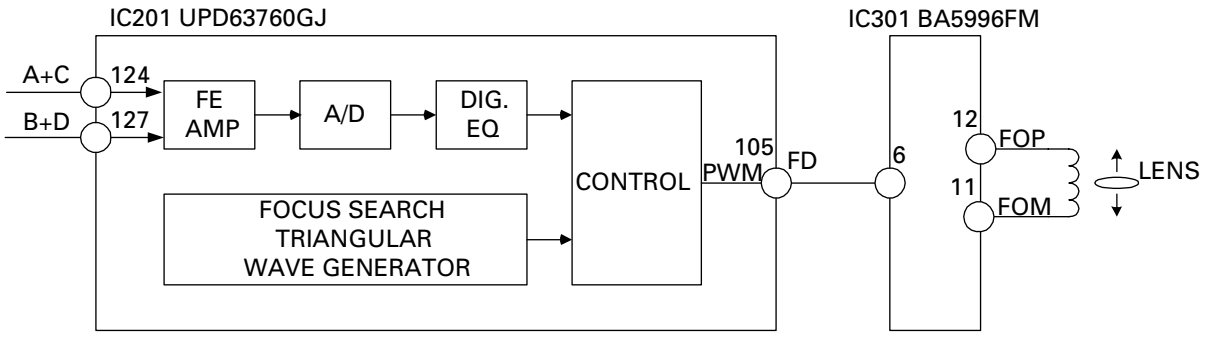



Fig. 1.2.1 Block diagram of the focus servo system

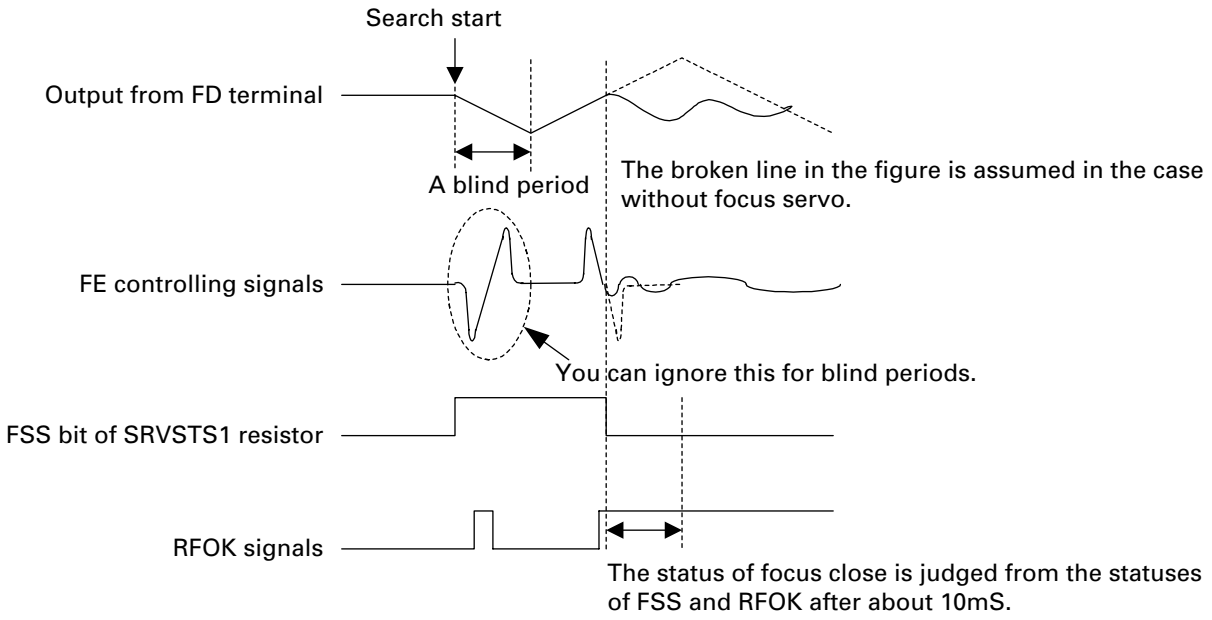

Search start
Output from FD terminal
A blind period
The broken line in the figure is assumed in the case without focus servo.
FE controlling signals
You can ignore this for blind periods.
FSS bit of SRVSTS1 resistor
RFOK signals
The status of focus close is judged from the statuses of FSS and RFOK after about 10mS.

Fig. 1.2.2 Timing chart for focus close operations

### 1.2.2 Tracking servo system

In the tracking servo system, the digital equalizer block is used as its main equalizer. The figure 1.2.3 shows the block diagram of the focus servo system.

(a) Track jump

Track jump operation is automatically performed by the auto-sequence function inside the LSI with a command from the microcomputer. In the search mode, the following five track jump modes are available: 1, 4, 10, 32, and 32*3

In the test mode, 1, 32, and 32*3 track jump modes, and carriage move mode are available and can be switched by selecting the mode.

For track jumps, first, the microcomputer sets about half the number of tracks to be jumped as the target. (Ex. For 10 track jumps, it should be 5 or so.) Using the TEC signal, the microcomputer counts up tracks. When the counter reaches the target set by the microcomputer, a brake pulse is sent out to stop the lens. The pulse width is determined by the microcomputer. Then, the system closes the tracking loop and proceeds to the normal play. At this moment, to make it easier to close the tracking loop, the brake circuit is kept ON for 50msec after the brake pulse, and the tracking servo gain is increased.

In the normal operation mode, the FF/REW operation is realized by continuously repeating single jumps about 10 times faster than the normal single jump operation.

(b) Brake circuit

The brake circuit stabilizes the servo-loop close operation even under poor conditions, especially in the setting-up mode or track jump mode. This circuit detects the lens-moving direction and emits only the drive signal for the opposite direction to slow down the lens. Thus, this makes it easier to close the tracking servo loop. The off-track direction is detected from the phases of the TEC and MIRR signals.

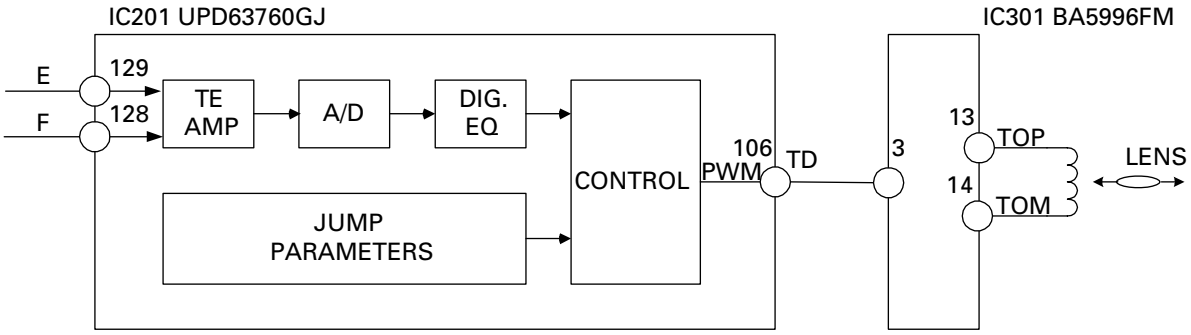



Fig. 1.2.3 Block diagram of the tracking servo system

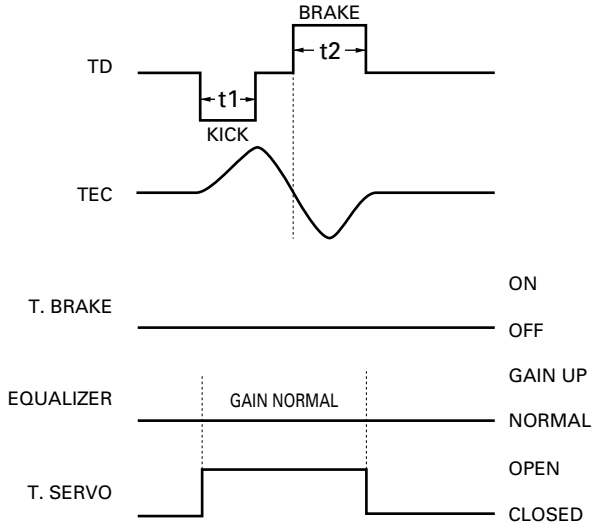



Fig. 1.2.4 Single-track jump

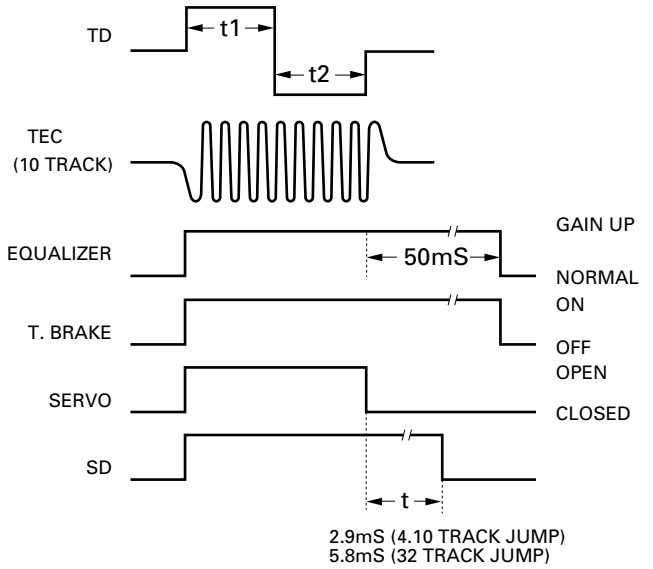
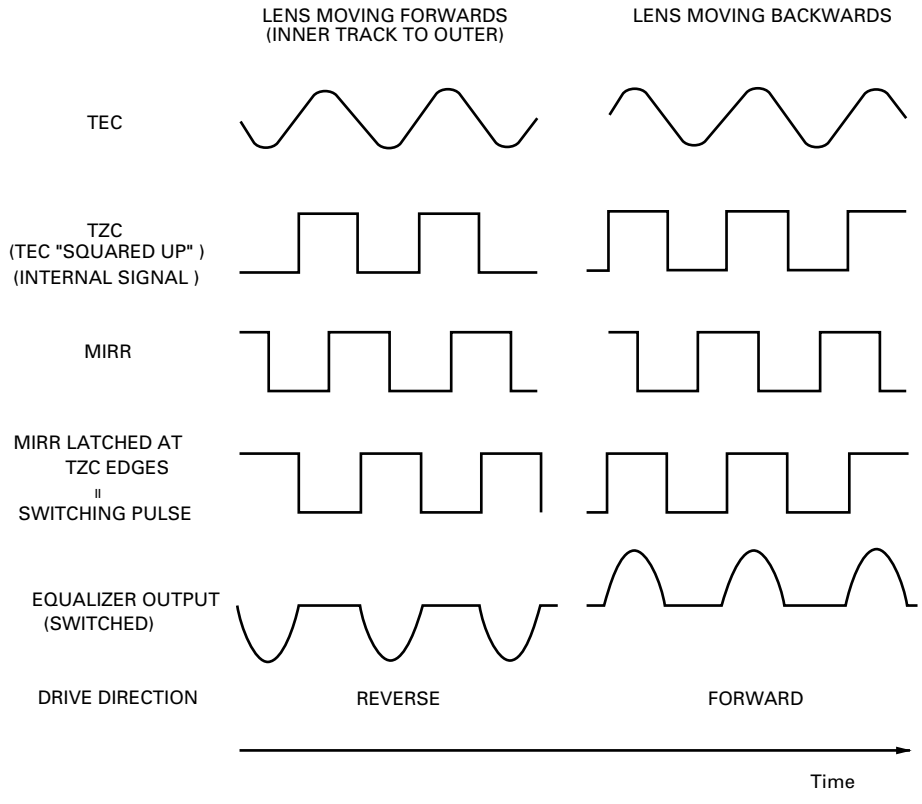



Fig. 1.2.5 Multi-track jump




Note : Equalizer output assumed to hava same phase as TEC.

Fig. 1.2.6 Track brake

### 1.2.3 Carriage servo system

In the carriage servo system, the low frequency component from the tracking equalizer (the information on the lens position) is transferred to the carriage equalizer, where the gain is increased to a certain level, and then sent out from the LSI as the carriage drive signal. This signal is applied to the carriage motor via the driver IC.

During the play mode, when the lens offset reaches a certain level, it is necessary to move the pickup toward the FORWARD direction. The equalizer gain is adjusted so that the output over the carriage motor starting voltage is sent out in such a case. In actual operations, only when the equalizer output exceeds the threshold level preset in the servo LSI, the drive signal is sent out. This can reduce the consumption power.

With an eccentric disc loaded, before the whole pickup starts moving, the equalizer output may exceed the threshold level a few times. In this case, the drive signal applied from the LSI shows pulse-like waveforms.

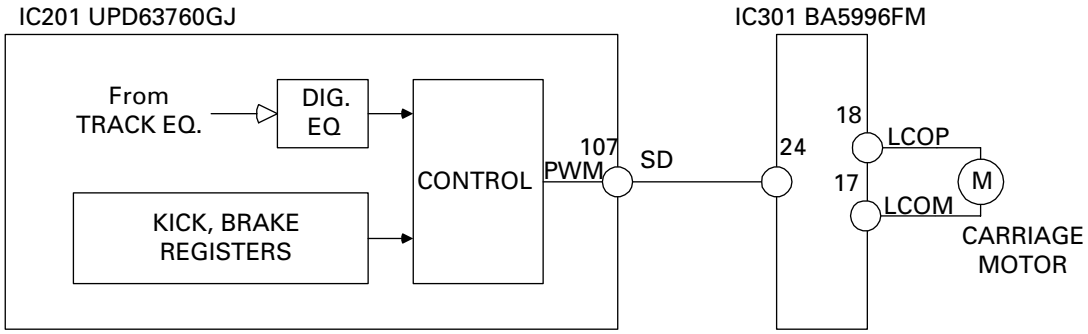



Fig. 1.2.7 Block diagram for the carriage servo block

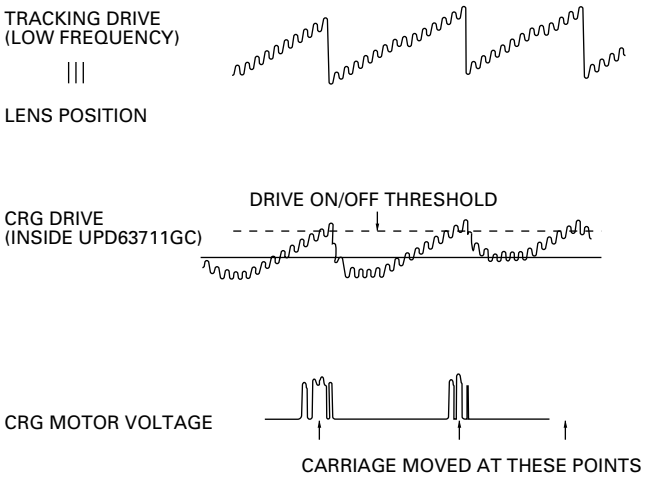



Fig. 1.2.8 Waveforms of the carriage signal

### 1.2.4 Spindle servo system

In the spindle servo system, the following six modes are available:

1) Kick

Used to accelerate the disc rotation in the setting-up mode.

2) Offset

a. Used in the setting-up mode until the AGC completes after the kick mode.

b. Used when the focus loop is unlocked during the play mode and until it is locked again.

In both cases, the mode is to keep the disc rotation near to the appropriate one.

3) Applicable servo

In the normal operation, the CLV servo mode is used.

The EFM demodulation block detects through WFCK/16 sampling whether or not the frame sync signal and the internal frame counter output are synchronized, and generates the status signal based on the sampling result, synchronized or non-synchronized. If eight consecutive "non-sync" signals are obtained, the system senses the status as "non-sync". If not, the system senses as "sync". In the applicable servo mode, the leading-in servo mode is automatically selected at the non-sync status, and the normal servo mode is at the sync status.

4) Brake

Used to stop the spindle motor.

In accordance with the microcomputer's command, the brake voltage is sent out from the servo LSI. At this moment, the EFM waveform is being monitored in this LSI. When the longest EFM pattern exceeds a certain cycle (or the rotation slows down enough), a flag is set inside the LSI, and the microcomputer switches off the brake voltage. If a flag is not set within a certain period, the microcomputer shifts the mode from the brake mode to the stop mode, and keeps this for a certain period. In the eject mode, after the mode is shifted to the stop mode and a certain period passes, the loaded disc is ejected.

5) Stop

Used when the power is turned on and during the eject mode. At this moment, the voltage through the spindle motor is 0V.

6) Rough servo

Used when the carriage is moved (or in the carriage move mode such as long search).

By obtaining the linear velocity from the EFM waveform, "H" or "L" is applied to the spindle equalizer. In the test mode, this mode is used for grating confirmation.

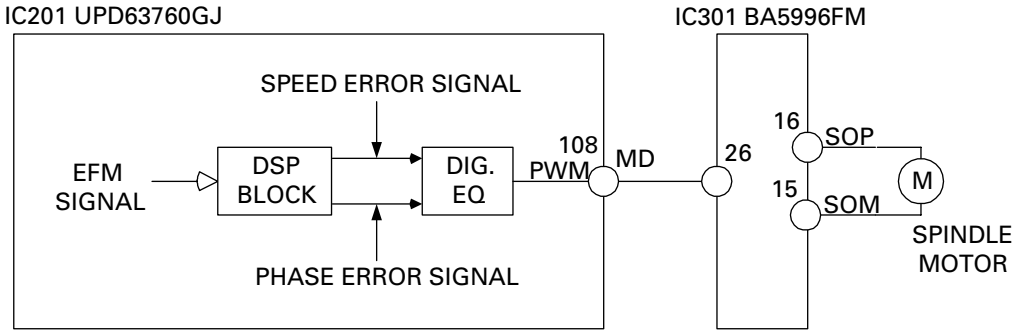



Fig.1.2.9 Block diagram of the spindle servo system

## 1.3 AUTOMATIC ADJUSTMENT FUNCTION

This system automatically handles the circuit adjustment inside the CD LSI. All adjustments are performed whenever a disc is inserted or the CD mode is selected by pressing the source key. Each adjustment will be explained below.

### 1.3.1 TE, FE, and RF offset auto-adjustment

This adjustment is made to adjust the offsets of the TE, FE, and RF amplifiers in the preamplifier block to their target values on the basis of the REFO when the power is turned on. (The target values for TE, FE, and RE offsets are 0V, 0V, and -0.8V respectively.)

<Adjusting procedures>

1) With the LD OFF status, the microcomputer reads each offset through the servo LSI.

2) The microcomputer calculates the voltages for correction from the measured values, and inputs the calculated results as the offset adjustment values.

### 1.3.2 Tracking balance (T.BAL) auto-adjustment

This adjustment is to equalize the pickup output offsets for E-ch and F-ch by changing the amplifier gain inside the LSI. Actually, the gain is adjusted so that the TE waveform becomes symmetrical on each side of the REFO.

<Adjusting procedures>

1) The focus loop is closed.

2) The lens is kicked in the radial direction to make certain that the TE waveform is generated.

3) The microcomputer reads the TE offset calculated in the LSI through the servo LSI.

4) The microcomputer takes either of the following steps depending on the calculated offset:

• When the offset is 0, the adjustment completes.

• When the offset is positive or negative, the amp gains for E-ch and F-ch should be changed.

The steps 2) to 4) are repeatedly taken until the offset becomes 0 or the repeating time reaches the limit frequency.

### 1.3.3 EF bias auto-adjustment

This adjustment obtains the best focus point during the play mode and maximizes the RFI level by utilizing the phase difference between the 3T level of the RF signal and that of the signal obtained when focus error disturbance is applied to the focus loop. At this moment, the auto-gain control (AGC), where focus error disturbance is applied to the focus and tracking loops, is also performed as explained below.

<Adjusting procedures>

1) The microcomputer transmits the command to apply disturbance component to the focus loop (inside the servo LSI).

2) In the LSI, the 3T-offset component of the RF signal is detected.

3) From the relation between the 3T detected component and the disturbance, the LSI obtains the volume and direction of the focus offset.

4) The microcomputer transmits the command and reads out the detecting result from the servo LSI.

5) The microcomputer calculates the necessary correction and inputs the result as the bias adjustment value to the servo LSI.

The adjusting steps are repeated a few times for higher adjustment accuracy as same as those for the AGC.

### 1.3.4 Focus and tracking AGC

This function automatically adjusts the focus and tracking servo loop gains.

<Adjusting procedures>

1) Disturbance component is applied to the servo loop.

2) The error signals (FE and TE) are extracted through the band pass filter as the G1 and G2 signals.

3) The microcomputer reads the G1 and G2 signals through the servo LSI.

4) The microcomputer calculates the necessary correction and performs the loop gain adjustment inside the servo LSI.

For higher adjustment accuracy, the above steps are repeated a few times.

### 1.3.5 RF level auto-adjustment (RFAGC)

This adjustment minimizes the dispersion of the RF level (RFO), which may be caused by disc-related errors, for more stable signal transmission by changing the amp gain between RFI and RFO.

<Adjusting procedures>

1) The microcomputer sends the command to the servo LSI to read out the output from the RF level detecting circuit inside the servo LSI.

2) The microcomputer calculates the appropriate amp gain by using the output read out to adjust the RFO level at the prescribed one.

3) The microcomputer sends the command to the servo LSI to adjust the amp gain into the calculated one.

This adjustment is automatically performed when:

1) During the setting-up mode, only the focus close operation ends.

2) Immediately before the setting-up ends (or right before the play mode starts)

3) During the play mode, the focus loop is locked again after unlocked.

### 1.3.6 Pre-amp gain adjustment

In this adjustment, when the reflected beams from disc surface are extremely weak (ex. when the lens is dirty, and a CD-RW is loaded), the whole gain in the RFAMP block (FE, TE, and RF amplifiers) is increased by +6dB or +12dB.

<Adjusting procedures>

When the system senses that the reflected beams from disc surface are extremely weak during the setting-up mode, the whole RFAMP gain is increased by +6dB or +12dB.

After the gain is changed, the setting-up mode is restarted.

If the whole RFAMP gain is always increased to the +6dB level in the play mode, the +6dB level will be employed at the starting of the setting-up mode from the next playback.

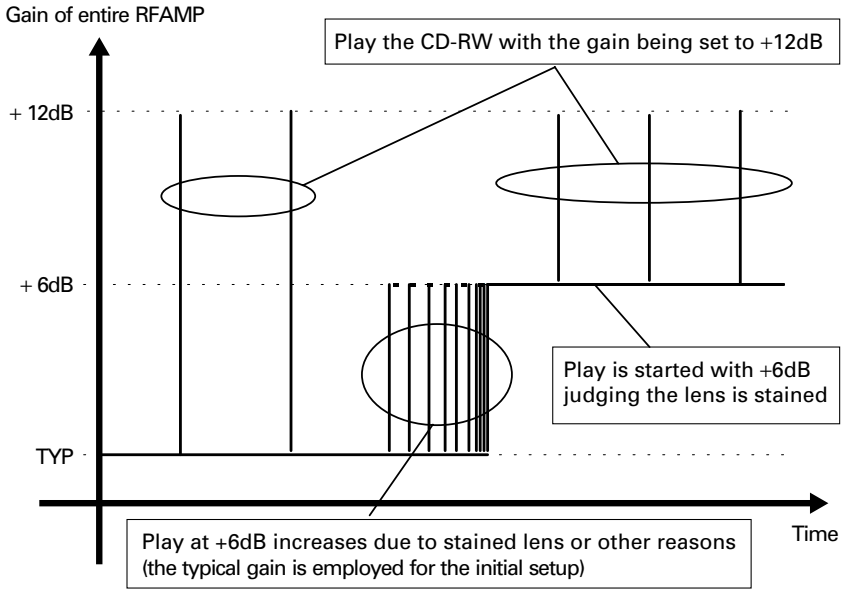

Gain of entire RFAMP
Play the CD-RW with the gain being set to +12dB
+ 12dB
+ 6dB
Play is started with +6dB
judging the lens is stained
TYP
Time
Play at +6dB increases due to stained lens or other reasons
(the typical gain is employed for the initial setup)

Fig.1.3.1 Pre-amp gain adjustment

### 1.3.7 Initial values in adjustment

For each auto-adjustment, the last adjustment results are basically used as the initial settings of the next adjustment unless the microcomputer is turned off (or the backup is off). When the microcomputer (or the backup) is turned off, the last adjustment results are not used, but the factory settings.

### 1.3.8 Adjustment result display

For some of the adjustments (FE and RF offset, FZD cancel, F and T gain, and RFAGC), the adjustment results can be displayed and confirmed in the test mode.

1) FE and RF offset

Reference coefficient = 32 ("32" indicates no adjustment required)

The display is expressed in the unit of about 32mV.

Ex. When the FE offset coefficient is 35:

35 - 32 = 3 x 32mV = 96mV

This means that the correction is about +96mV, and the FE offset before adjustment is -96mV.

2) F and T gain adjustment

Reference coefficient for focus and tracking = 20

The displayed coefficient / the reference coefficient indicates the adjusted gain.

Ex. When the AGC coefficient is 40:

40/20 = 2 times (+6dB)

That is, the gain was adjusted by +6dB.

(The original loop gain was half the target one. So, the whole gain was doubled.)

3) RF level adjustment (RFAGC)

Reference coefficient = 8

The coefficient 9 to 15 indicates increasing the RF level.

The coefficient 0 to 7 indicates decreasing the RF level.

When the coefficient display changes by 1, the gain changes by 0.7 to 1dB.

When the coefficient is 15, the gain is maximum or TYP + 6.5dB.

When the coefficient is 0, the gain is minimum or TYP - 6.0dB.

## 1.4 POWER SUPPLY AND LOADING BLOCK

The VD (8.3 + 0.5V) and the VDD (5.0 + 0.25V), which are supplied from the mother PC board, are used for the power supply. In this system, the following four power-supply signals are available: the VD (for the drive system), the V3R3 obtained from the VD via the 3.3V regulator (for the control system: 3.3V), the VDD (for the microcomputer: 5V), and the 3VDD obtained from the VDD via the 3.3V regulator (for the microcomputer: 3.3V)
In the WMA-supported mechanism CXK5556, the V2R5 (for WMA decoder: 2.5V) is also used.
The microcomputer can turn on/off the CD driver (except for the load and eject modes) and the 5V signal by controlling the "CONT" and "CD5VON" signals respectively. To turn on/off the loading drive, there is no control terminal in the microcomputer, but the "LOEJ" input signal works as the control one. In the LCO output block, the "CLCONT" signal is used to switch between the loading mode and carriage mode.

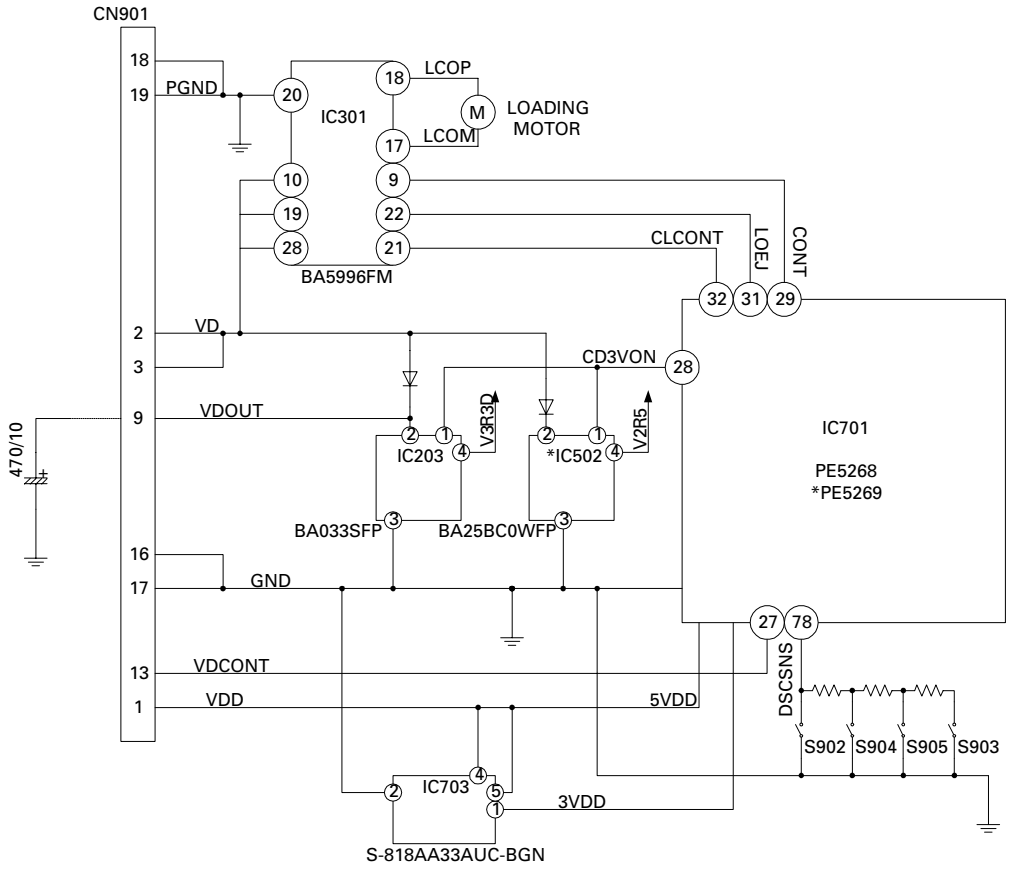



Fig. 1.4.1 Power supply/loading block (*: CXK5556, CXK5557)

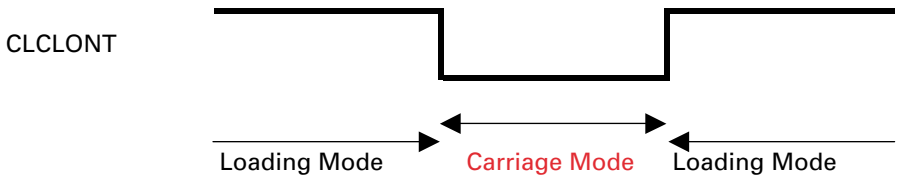



Fig. 1.4.2 Loading/carriage mode shift

To control the load and eject operations, the clamp switch located in the mechanism unit and the three detecting switches located in the control unit are used. Depending on the combination of these switches' ON/OFF status, the DSCSNS voltage changes.
The microcomputer can detect the status (A to E) by observing the voltage at the A/D port. The disc size detection (8 or 12cm) is also performed through this status change. The DSCSNS status and the status change in the load and eject modes are shown in the figures 1.4.3 and 1.4.4 respectively.

| STATUS | A | B | C | D | E |
|---|---|---|---|---|---|
| SW1(S903) | ON | OFF | OFF | OFF | ON |
| SW2(S905) | OFF | OFF | ON | ON | OFF |
| SW3(S904) | OFF | OFF | OFF | ON | OFF |
| SW4(S902) | OFF | OFF | OFF | OFF | ON |
| MECH. STATUS | NO DISK | | | | CLAMP |

Fig.1.4.3 DSCSNS status

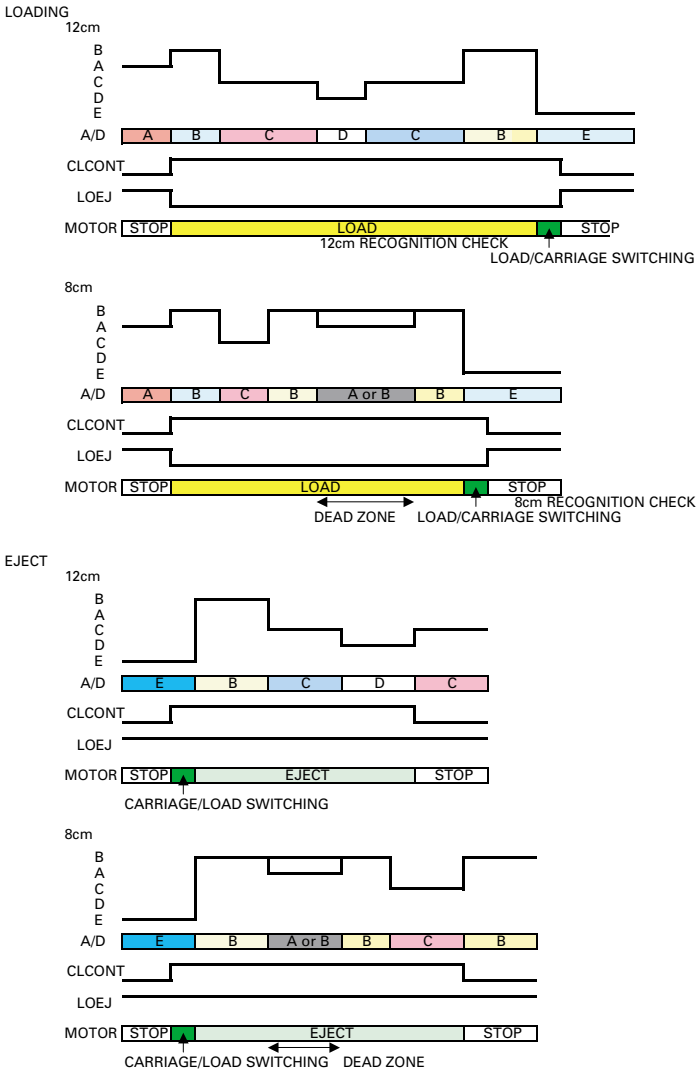
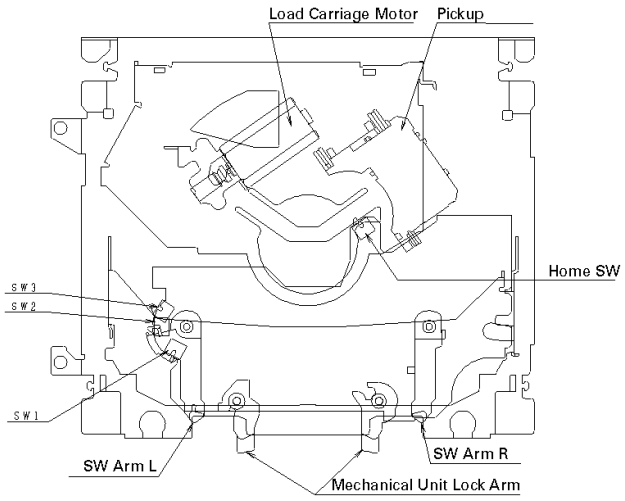


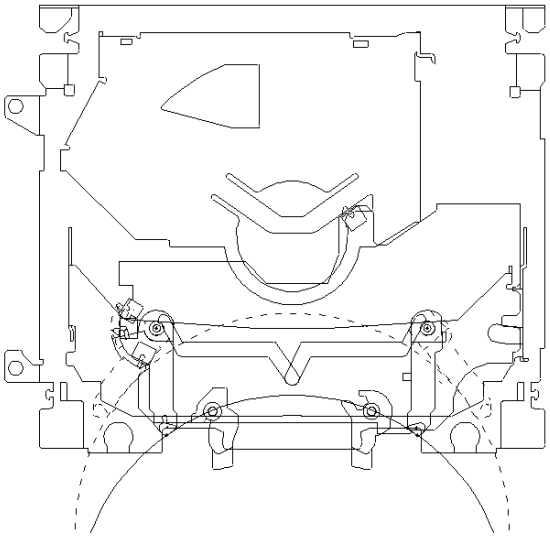

Fig.1.4.4 Status change in LOAD and EJECT modes

# 2. MECHANISM DESCRIPTIONS

## ● Loading actions

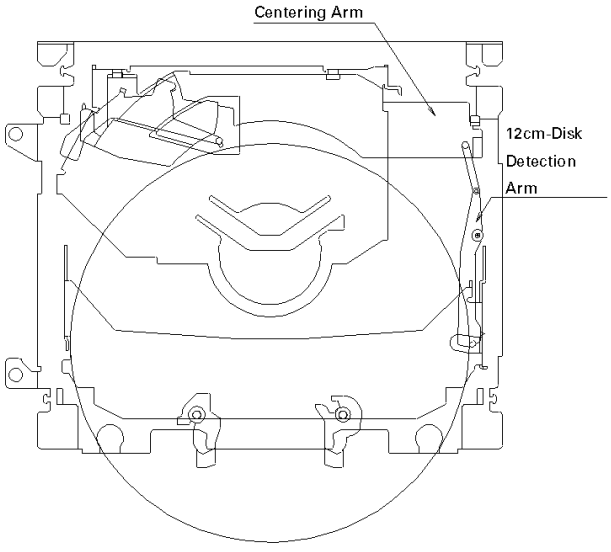
1. When a disk is inserted, SW Arm L and R rotate. Due to the rotation of Arm L, SW1 is switched from ON to OFF and the Load Carriage Motor starts.
2. If the disk is 12cm-disk, when it is carried to the position shown with the dotted line in the drawing, SW 3 switches to ON due to such rotation of Arm L. Then, the microcomputer judges that the disk is 12cm-disk.
3. In case of 8cm-disk, the disk cannot reach such dotted line position, and from such limitation of approach, the microcomputer judges that the disk is 8cm-disk and simply triggers clamp actions.
   (Movement of SW Arm L and R are connected together. So, if pushing force is fed to only one arm, the distance between tow arms cannot be widened beyond the specific degree, because the coupling part is locked in such case.)

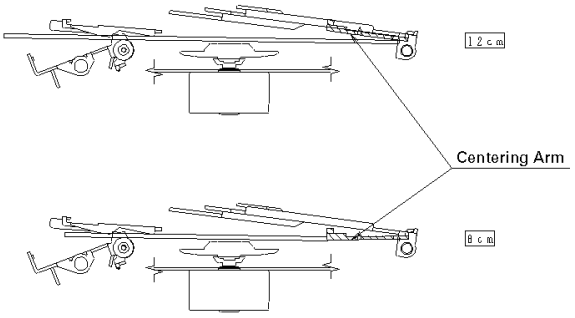


## ● Disk centering mechanism

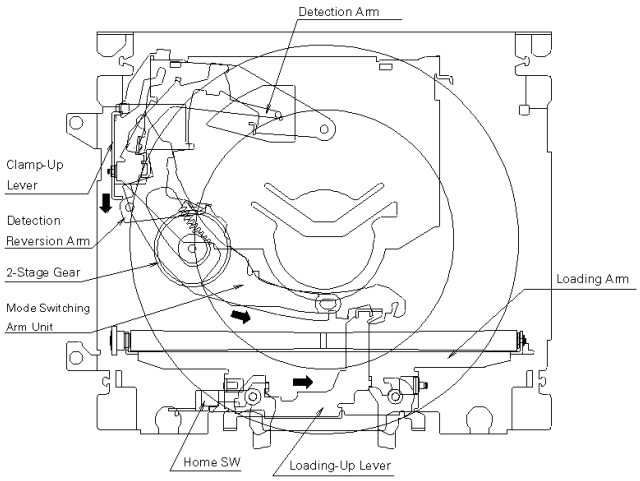
1. In case of 12cm-disk, the 12cm-Disk Detection Arm rotates, and with such rotation, it raises the Centering Arms to retreat the arms from disk's trace. The disk passes through under the arms, and at the inner part, it is centered.
2. In case of 8cm-disk, it is just centered at the position where its edge touches the front portion of the Centering Arm.

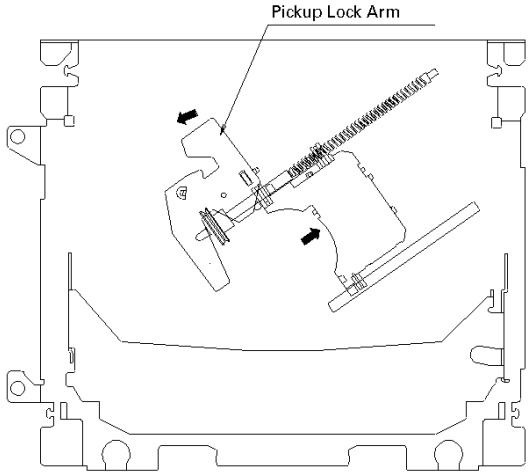


## ● Clamp actions

1. When centering of 12 or 8cm-disk onto the Spindle is completed, the Detection Arm starts driving.
2. Then, the Detection Arm, via the Detection Reversion Arm, triggers driving of the Plunging Rack, which is on the Mode Switching Arm unit, in order to engage the rack with the 2-Stage Gear.
3. With such engaging, the Mode Switching Arm rotates, and with the rotation, slides the Clamp-Up Lever and pushes down the Clamp Arm. At the same time, the Mode Switching Arm slides the Loading-Up lever, and separates the Loading Arm from the disk. Also, the Loading-Up Lever rotates the Mechanics Lock Arm, releases the Mechanics Lock, and switches on the Clamp SW. Now, at this position (the position where the disk is situated when the Clamp SW is switched on), clamping actions are completed.
4. Then, upon the completion of clamping actions, the Plunging Rack lets the Pickup Lock Arm start rotating, and this Pickup Lock Arm, with such rotation, feeds the Pickup to Feed Screw's screw portion. Now, Carriage actions start.



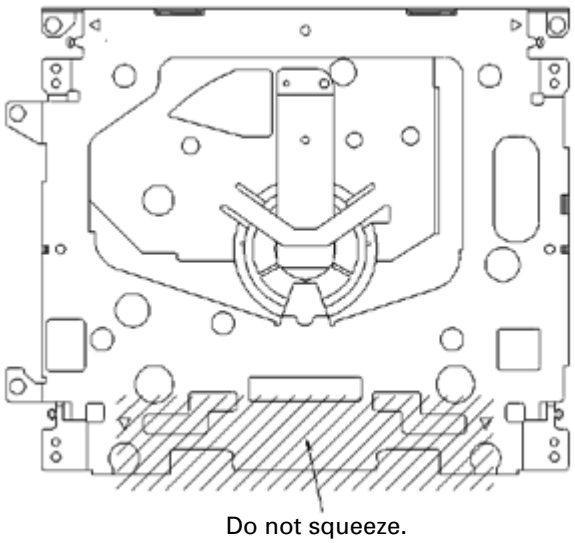

## ● Eject actions

1. Eject actions start when the Pickup is fed to the position inner than "Home SW ON" point in the internal circumference of the circle, caused by backward rotation of the Load Carriage Motor. Eject actions follow the foregoing procedures (steps taken in loading, centering and clamping actions), but each action in those steps is performed in reversed manner.
2. In case of 12cm-disk, Eject is completed when SW3 completes its condition- transition of OFF → ON → OFF.
3. For 8cm-disk, Eject is completed when SW2 completes its condition-transition of OFF → ON → OFF.

# 3. DISASSEMBLY

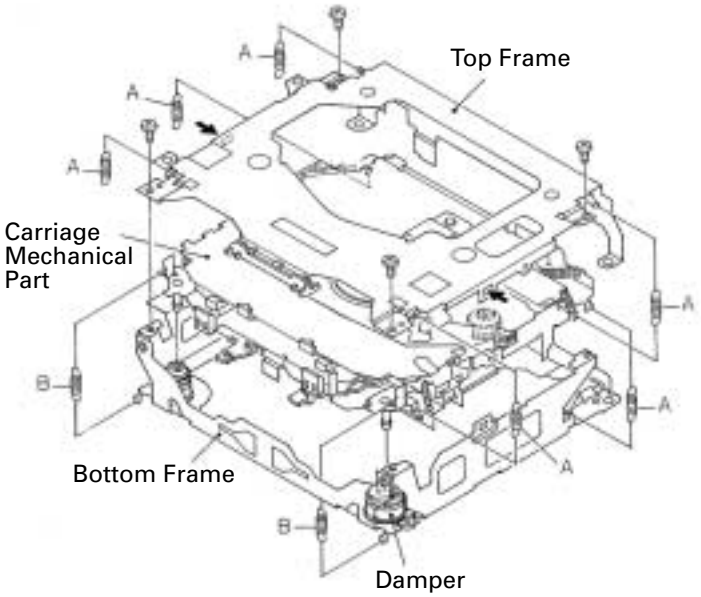
### ● How to hold the Mechanical Unit

1. Hold the top and bottom frame.
2. Do not squeeze top frame's front portion too tight, because it is fragile.



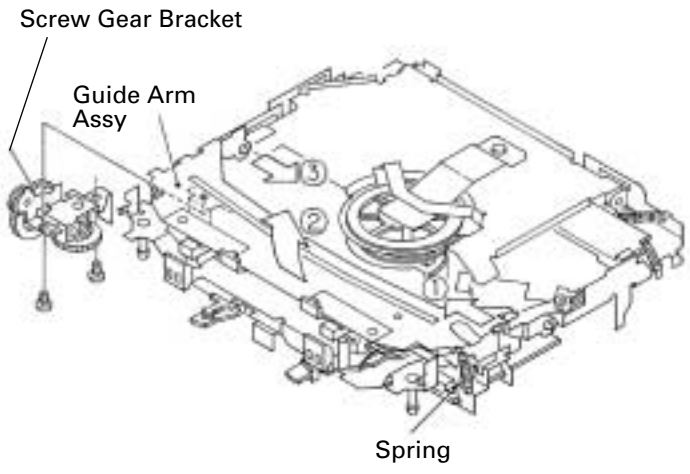

### ● How to remove the Top and Bottom Frame

1. When the disk is in "clamp" state, unlock Spring A (6 pieces) and Spring B (2 pieces), and unscrew screws (4 pieces).
2. Unlock each 1 of pawl at the both side of the frame, then remove the top frame.
3. Remove the Carriage Mechanical part in such way that; you remove the mechanical part from 3 pieces of Damper while slowly pulling up the part.
4. Now, the top frame has been removed, and under this state, fix the genuine Connector again, and eject the disk.
   (Caution)
   When you reassemble the Carriage Mechanical part, apply a bit of alcohol to Dampers.



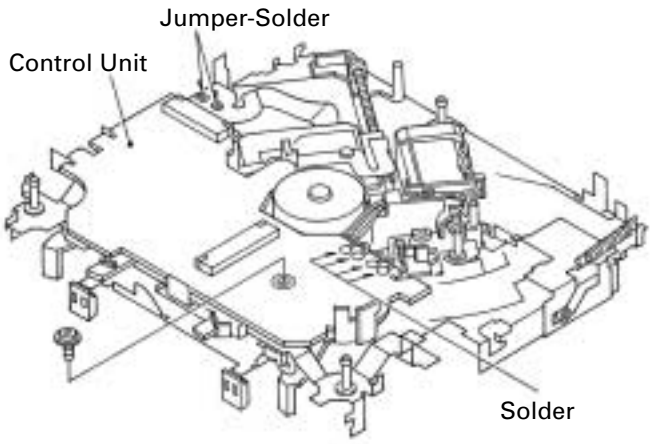

### ● How to remove the Guide Arm Assy

1. Unlock the spring (1 piece) at the right side of the assembly.
2. Unscrew screws (2 pieces), then remove the Screw Gear Bracket.
3. Shift the Guide Arm Assy to the left and slowly rotate it to the upper direction.
4. When the Guide Arm Assy rotates approximately 45 degree, shift the Assy to the right side direction and remove it.



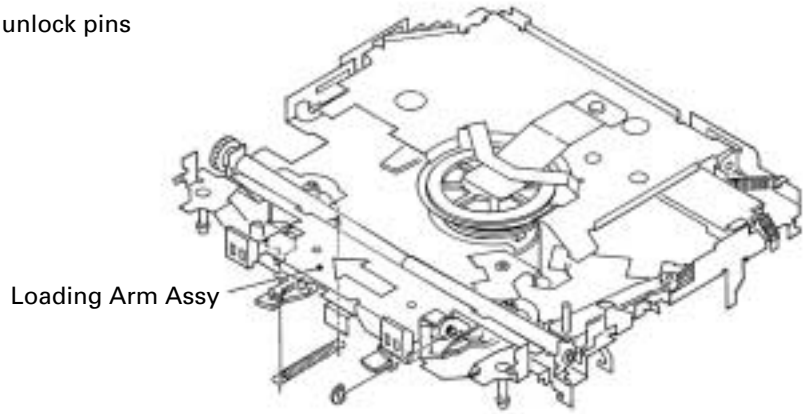
### ● How to remove the Control Unit

1. Give jumper-solder treatment to the Flexible Wire of the Pickup unit, then remove the wire from the Connector.
2. Remove all 4 points of solder-treatment on the Lead Wire. Also, unscrew the screw(1 piece).
3. Then, Remove the Control unit.
   (Caution)
   Be careful not to damage SW when you reassemble the Control Unit into the device.



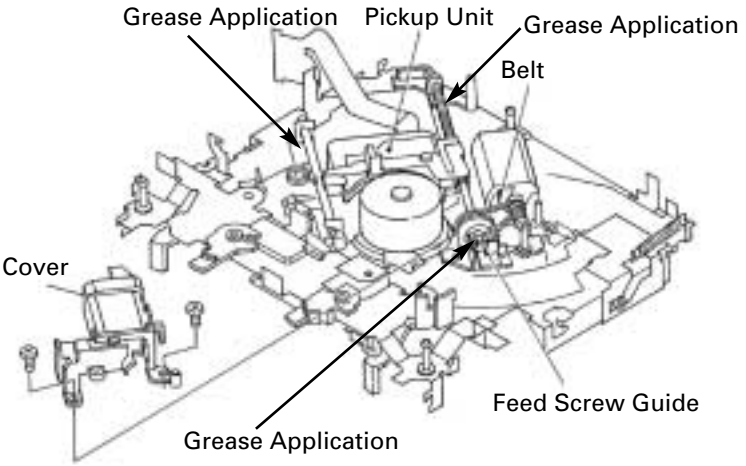

### ● How to remove the Loading Arm Assy

1. Unlock the spring (1 piece) and remove the E ring (1 piece) of the Fulcrum Shaft.
2. Shift the arm to the left side direction and unlock pins (2 pieces).



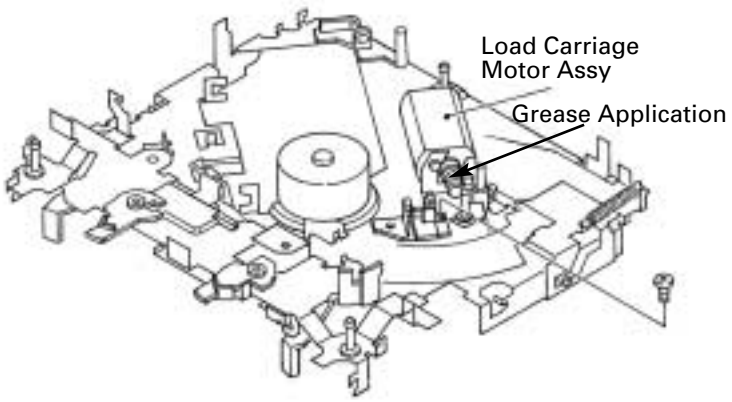

### ● How to remove the Pickup Unit

1. Unscrew 2 pieces of screws, then remove the Pulley Cover.
2. Remove the Feed Screw unit from the pawl of the Feed Screw Guide (The pawl is located inside the guide).
3. Remove the belt from the Pulley, then remove the Pickup unit.
   (Caution)
   Make sure not to stain the belt with grease when you fix the belt.



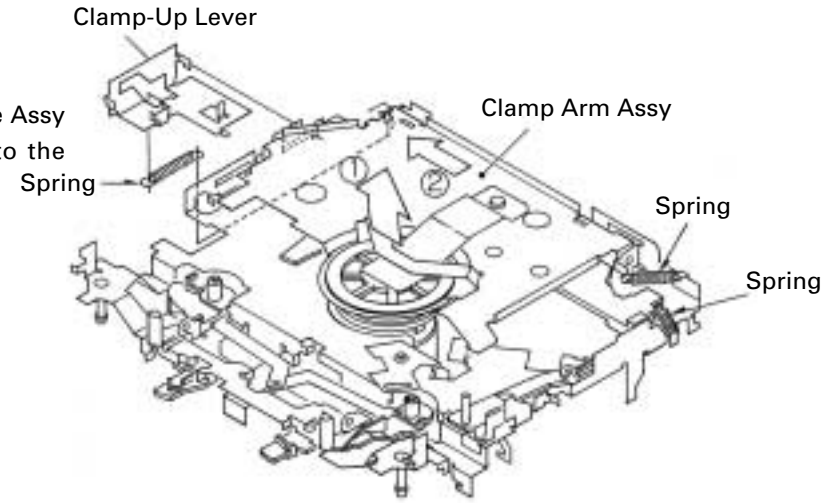
### ● How to remove the Load Carriage Motor Assy

1. Unscrew the screw (1 piece).
2. Remove the Load Carriage Motor Assy.




### ● How to remove the Clamp Arm Assy

1. Unlock springs (3 pieces).
2. Remove the Clamp-Up Lever.
3. Remove the Assy in such way that; you shift the Assy to the left side direction while you rotate it to the upper direction slowly.




### ● How to remove the Spindle Motor

1. Unscrew 2 pieces of screws. Then you can remove the motor.